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Soil Conservation

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Volume 32
August 1966 to July 1967

Issued January 1968

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SOIL CONSERVATION SERVICE

U.S. DEPARTMENT OF AGRICULTURE

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Subscription price: $2.00 per year; 75 cents additional for foreign mailing. Index issues vary in price. This issue 10 cents.

United States Department of Agriculture Soil Conservation Service

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U.S. GOVERNMENT PRINTING OFFICE: 1968

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AUGUST 1966
VOL. 32 NO. 1

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Soil Conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

NONFARM USES OF SOIL SURVEYS

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SOIL CONSERVATION SERVICE
U. S. DEPARTMENT OF AGRICULTURE

32 Years . . .

This issue begins the 32d year of publication of *Soil Conservation.*

Appropriately, we devote much of it to one of the newest and most significant developments in conservation technology—the use of soils information in nonfarm uses of the land.

Payoff: To tell this story, we called on soils men in field stations to report examples from their experience.

From the myriad of case histories, Soil Interpretation Director A. A. Klingebiel was able to express results in terms of cost-benefit ratios for different intensities of land use (p. 3).

These figures vary widely, of course, for specific cases, but it's the exceptional survey that doesn't *pay for itself in 1 year.*

Many promise to return benefits worth 100, 200, or more, times the cost in the 25-or-so years of their usefulness.

First Principle: Three decades ago, SCS launched its operations on the principle that every land use and conservation decision should be based on a physical inventory of the area to be treated; i.e., a soil survey.

SCS has never deviated from that principle. In the many expanding programs since, other data have been needed too, but always the soil survey was basic.

The growing demands of urban developments are no exception.

COVER: A soil scientist in a typical pose, resting his map case on his auger as he draws the boundaries his trained eye sees in the landscape before him, in the Allegheny Soil and Water Conservation District, N. C.

Soil Conservation

Devoted to the wise use of land and water resources

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SOIL CONSERVATION is the official organ of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. The printing of this publication was approved by the Bureau of the Budget July 25, 1963.

ORVILLE L. FREEMAN — Secretary of Agriculture
JOHN A. BAKER — Assistant Secretary of Agriculture
DONALD A. WILLIAMS — Administrator, Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service,
U. S. Department of Agriculture, Washington, D. C. 20250

BEN O. OSBORN, Editor — GEORGIE A. KELLER, Production Editor

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Subscription: $1.75 per year, $2.50 foreign. Single copy, 15 cents. Discount of 25 percent on orders of 100 or more sent to same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D. C. 20402.

Costs and Returns of Soil Surveys

SEWAGE SYSTEM, Massachusetts: ***The town of Cohasset saved more than $250,000 on its sewage system by using information from an SCS soil survey. The survey showed that less than 1 percent of the town area was suitable for onsite sewage disposal.***

SCHOOL GROUNDS, Virginia: ***Fairfax County lost $250,000 in avoidable costs when it selected a school site without using a soil survey. Another site only 500 feet away had favorable soils, according to the survey.***

FARMLAND, Tennessee: ***A farmer in Fayette County increased his income more than $5,500 in 1 year alone. He studied a soil survey of his farm and made some adjustments in land use.***

WATER MAIN, Michigan: ***A town near Detroit is out $200,000 because its new water main was constructed across a 600-foot-wide area of deep peat. A soil survey could have indicated another route over normal mineral soils.***

WATER MANAGEMENT, Nebraska: ***Farmers in Hall County added from $5 to $150 an acre to their income by an improved water management system and reclamation of saline and alkali soils. The changes resulted from use of a soil survey in their area.***

RESIDENCES, Virginia: ***More than 100 homes in the suburbs of Richmond were flooded, resulting in several hundred thousand dollars worth of damage. This happened 2 years in a row. A soil survey would have spotlighted this hazard.***

Wide range of uses result in benefits that repay entire cost in first year

By A. A. Klingebiel,
Director, Soil Survey Interpretation, SCS

A SOIL SURVEY is an investment that is almost certain to pay for itself—and return a profit—within a year.

Figures on the costs of making surveys and the benefits derived from using them translate into cost-benefit ratios of the order of 1 to 45 and upwards for a survey that will be useful for at least 25 years. This indicates a minimum of nearly $2 of return *the first year* for each dollar spent for the entire cost of the survey.

Summarized in three groups according to the intensity of the land use in the areas surveyed, the following average cost-benefit ratios resulted:

Low intensity areas—predominantly range and woodland—1 to 46.

Medium intensity areas—mixed agriculture, about half cropland —1 to 61.

High intensity areas—fringes of rapidly growing metropolitan areas, about a fourth urbanized —1 to 123.

The intensity of the surveys themselves varies with the intensity of the land use pattern for which they are to be used. It is obvious that the value of the benefits increases more rapidly than the cost of surveying as land use intensity increases.

Soil surveys were originally designed to assist farmers and ranchers, but in recent years home builders, community planners, highway engineers, and others have discovered their multiple benefits. Requests for surveys in nonfarm areas have doubled in the past 2 years and are expected to double again in the near future.

$300 million saved

As one example of nonfarm use, Dr. Kurt Bauer, executive director of the Southeastern Wisconsin Regional Planning Commission, estimates that the use of soil surveys in his 7-county area will save $300 million in the cost of residential land development alone in the next 25 years. This is based on the expectation that 300,000 new homes will be built in the area during that period.

If soil maps are *not* use, approximately half of these new homes will be built on highly unsuitable soils, requiring an extra cost of $2,000 a home to provide initial onsite sewage disposal facilities and then to replace these later with centralized public sewerage facilities. But, by using soil maps before selecting homesites, the potential reconstruction costs can be avoided.

John R. Quay, an architect and consultant in Barrington, Ill., near

Chicago, states that if current trends continue, at least $1 billion worth of private construction will go up in the six-county region each year. Mr. Quay predicts that use of soil maps will save people in that area an average of $10 million annually in private building costs alone. This is a savings of more than $1.6 million dollars a county.

Added savings in both areas can be expected if soil survey maps are used for planning highways, airports, schools, and the like.

Obviously, the costs and benefits of soil surveys vary, depending on whether the area mapped is rangeland or suburbia, and how intensively it is surveyed.

Soil Conservation Service records show that survey costs vary from about 30 to 70 cents an acre. Thus, a soil survey for a county of 700 square miles may run from about $142,000 to $280,000.

A little more than half that cost goes for field mapping and soil descriptions. The remainder is for laboratory and research work on soil classification, correlation, and interpretations, for map compilation, writing and editing the report, and publishing expenses.

Overall, the average total cost to SCS in fiscal year 1965 for surveying more than 52 million acres and publishing 37 soil surveys (about 17 million acres) was approximately 43 cents an acre.

In determining costs and benefits of soil surveys it is reasonable to assume that they will be highly useful for at least 25 years. Spread over this period, the 30- to 70-cent total cost would amount to a little more than 1 cent to about 3 cents an acre a year, depending on the intensity of the survey.

How benefits are determined

Estimates of benefits are based on case histories and records of soil survey users. The figures come from average cost and benefit figures, and the projections are based on past experience in using soil surveys. It is assumed that most people in the surveyed area, or their builders or advisers, would use the soil information.

It is assumed that farmers and ranchers benefit from soil surveys each year through improved management on the same land. For nonfarm uses, soil survey benefits are assumed only once for each acre.

In many instances, especially among nonfarm users, the benefits will come through changing their original land use plans. The assumption is that, without a soil map, the original plans would be carried out, and costly repairs often would be necessary. With the surveys, these costs would be avoided.

Nonfarm benefits

Savings to nonfarm users are estimated at $250 an acre. This is conservative when compared to benefits actually reported by many users in rapidly expanding areas.

Dr. Thomas H. Thornburn of the University of Illinois described before the 1965 annual meeting of the Soil Science Society of America how the choice of route for 10 miles of interstate highway in Ford County, Ill., could make a difference of $810,000 in construction costs.

According to the soil map, one route under consideration had a number of soils poorly suited to highway use. The other had better soils. Since the highway would be 300 feet wide, it would require 360 acres of land. The difference in excavation and construction costs between the two routes would amount to $2,250 an acre saved by using the more favorable route indicated by the soil survey.

Savings of $30,000 to $225,000 have been reported in selecting school sites after using a soil survey. Some soil, of course, has a low load-bearing quality, is subject to flooding, or unsuited for onsite sewage disposal.

Such soil, if improperly selected, can add thousands of dollars to the cost of school foundations, preparation of athletic fields, and so on. Assuming 20 acres for a school site, use of a soil map could save $1,500 to $11,250 an acre.

Irrigated land

Savings from using soil surveys on irrigated cropland are estimated as an average of $5 an acre a year. Some users, who grow high value crops, report savings as high as several hundred dollars an acre.

Soil surveys can warn against land leveling and the removal of topsoil on soils shallow to gravel or claypan. Yield reduction here could amount to $50 to $100 an acre annually.

A precise and scientific knowledge of the soil can also reduce the amount of irrigation water needed, predict the reaction of crops to different fertilizers, and indicate whether land high in toxic salts is worth reclaiming.

Nonirrigated farmland

The benefits from soil surveys on nonirrigated farmland are estimated at about $1 an acre a year on the medium and high intensity use areas and 40 cents an acre in the low intensity areas where the main crops are small grains, hay, and tame pasture. These estimates, too, are conservative when compared to benefits reported by many users.

One of the major benefits comes from selecting soils best suited for a particular crop and then applying knowledge gained on similar soils with the same crop. Surveys can also pinpoint the need for soil drainage, the kind, spacing, and depth of drains, and any necessary erosion control measures.

After years of growing corn and cotton on his hilly fields, a farmer in Fayette County, Tenn., checked a soil map for the first time. As a result, he selected another part of his farm for his crops and increased his yields three times and

Montana ranch illustrates low intensity use area made up largely of range, pasture, or woodland.

Medium intensity use—about half cropland and half pasture, woodland, and urban land—is illustrated (above) by an Ohio farming area. A Prince Georges County, Md., housing development (below) is typical of high intensity use of land near rapidly growing metropolitan areas.

his net income by more than $4,000. On 27 acres, this averages out to an increase of $128 an acre.

Many other farmers in the Southeastern tobacco-growing area report increased incomes of $200 to $300 an acre from using surveys to locate the best soils for growing tobacco.

Rangeland and woodland

On the extensive acreages of range and woodland where per-acre returns are low, benefits from use of soil surveys may amount to only 10 to 20 cents an acre annually, but individual benefits 10 times as great have often been reported. Soil maps can show where grass, shrubs, or trees will grow best and also indicate response to various range and woodland management practices.

To summarize, three typical areas, each of 700 square miles, have been described, and costs and benefits from soil surveys calculated as follows:

Low intensity use area.—Land use is about 15 percent dryland farming, 75 percent range or woodland, 5 percent irrigated farmland for general farm crops, 3 percent urban and other nonfarm uses, and 2 percent changing from farm to nonfarm use. Such an area is typical of parts of most States west of the 100th meredian.

The benefits of soil surveys, over a 25-year period, in this area are estimated at about $6.5 million. The total cost of the survey is about $142,000. Thus the cost-benefit ratio for the period comes to 1 to about 46.

In low intensity areas, it is assumed that farmers and ranchers benefit from the surveys at the rate of 40 cents an acre annually for dryland farming; $5 an acre for irrigated land; 10 cents an acre for forest, range, and recreation land; and $250 an acre for land converted from farm to nonfarm uses.

No benefits are claimed for the 3 percent of the area currently in

buildings, roads, and other nonfarm uses.

Medium intensity use area.—Such an area consists of about 48 percent cropland; 2 percent irrigated land; 42 percent pasture, range, or forest land; 4 percent in urban uses; and 4 percent now in farm use changing to nonfarm use in the next 25 years. This area is typical of commercial farming areas found in the Southern and North Central States.

Estimated benefits through use of soil surveys over a 25-year period will be approximately $12 million. The average cost of soil surveys is about $195,000. Thus, the benefit-cost ratio is 1 to about 61.

These figures assume that farmers benefit from soil surveys at the rate of $1 an acre annually for cropland; $5 an acre for irrigated land; 20 cents an acre for forest, range, and recreational land; and $250 an acre for land converted from farm to nonfarm use. No benefits are claimed for the 4 percent of land now in urban and road uses.

High intensity use area.—The land is about 35 percent commercial cropland; 15 percent forest, range, pasture, or recreational land; 23 percent used for cities, towns, and other nonfarm uses; and 27 percent changing from farm to nonfarm uses in the next 25 year. This is typical of many counties in or near rapidly growing metropolitan areas.

Surveys can prevent estimated losses of around $34 million over a 25-year period. The cost of soil surveys is approximately $280,000. The cost-benefit ratio is thus 1 to about 123.

The use of soil surveys, with proper interpretations, is the only practical way to project research data and experience from one area to another. Their small initial cost is quickly offset by the benefits, financial and other, that come from using the right soil for the right purpose. ♦

Guide for Urban Expansion

Virginia county makes soil surveys basis for zoning and building plans

By Charles J. Koch and John W. Clay
State Soil Scientist and Soil Survey Party Leader, SCS, Richmond, Va.

THE FINDINGS of "the official county soil scientist" are a routine requirement for approval of septic tank systems in Henrico County, Va., in the expanding use of soils information in areas of rapid development around the capital city of Richmond.

Henrico County, like many others in the United States, is cooperating financially with the Soil Conservation Service and the State experiment station in making the surveys. Officials of the county put the information to immediate use in zoning and public works construction.

One of the earliest uses of soils information was in the field of environmental sanitation, largely as the result of the initiative of the late Dr. B. F. Eckles, county health officer. He pioneered the use of soil maps to help find suitable lots for septic tank systems and, conversely, helped identify unsuitable locations early so that lot owners were saved from future money and health problems

A county ordinance of May 1962 made "the findings of the official county soil scientist from his examination of the soil of the land or lot of the application" a prerequisite for approval of a septic disposal system. Examinations for septic tanks are made by the sanitarian and a soil scientist.

The soil scientist makes both verbal and written recommendations to the county health department on lot limitations for septic system purposes. In addition, he prepares an interpretive colored map of prospective subdivisions based on his survey of the tract. Soils in the area are divided into four groups, depending on their desirability for septic tank use, and the map is made available to the Henrico County Planning and Zoning office.

Basis for zoning

When subdivision plans for septic systems are submitted, and the land is not suitable, approval probably will be denied. Approval may later be granted if the developer changes from a septic tank to a sanitary sewer system.

Road layouts in some proposed subdivisions may be revised so the more permeable soils can be used for septic systems. In other cases, only the portion using the right soils may be approved.

Septic system failure in Craven soil causes problems for several homeowners in a Henrico County residential development.

W. F. LaVecchia, planning administrator of Henrico County, says of the SCS soils surveys:

"We feel that your studies of proposed subdivisions, to determine their ability to take septic systems, have been of great value to this office and the developer.

"An outstanding example of the worth of soil interpretations is the case of the subdivision developer in the western part of the county who was made aware of the poor permeability of the soil within his project at an early date. He was put on notice that a sanitary sewer system would be needed instead of the septic tank systems originally planned. As a result, the developer was saved the time, effort, and money of subdividing and installing improvements on a tract of land which could not be developed with single family dwellings because the soil would not support septic tank systems.

"The extension of public sewer systems to the property was programed and the land subsequently developed to the benefit of the future homeowners, the general public, and the developer."

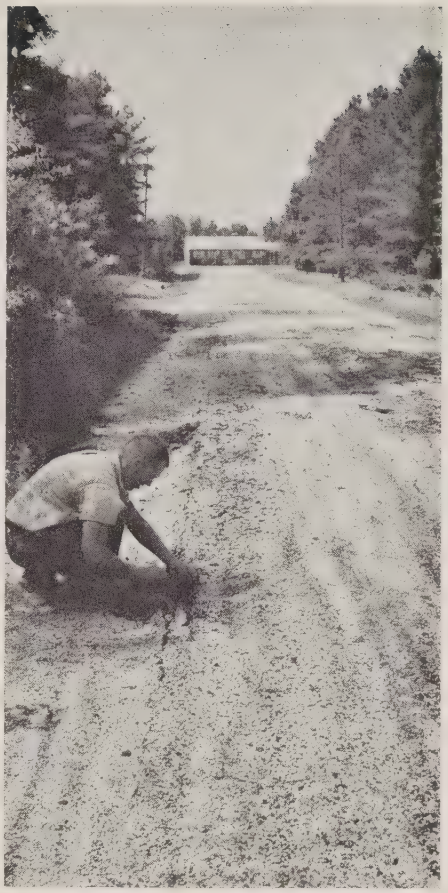
Schools use soil maps

In the last 5 years, soil investigations have been made of 13 Henrico County school sites. A number of money-saving changes resulted, according to George E. Eitel, director of school construction and maintenance.

In some cases buildings were put on soils favorable for foundation stability. Some poorly suited soils were used with proper drainage facilities and land preparations for playground and parking areas. In other cases alternate sites were chosen to avoid excessive foundation and drainage costs due to high shrink-swell clays and wet seepy soils.

As one example, on the recommendation of the SCS soil scientist, the proposed location of a new school building and its adjacent road were changed. By this action, the county saved an estimated $25,000 in foundation and drainage costs and $5,000 in potential maintenance costs.

Currently, the SCS soil scientist is studying a proposed school site that is plagued with high shrink-swell clays, seepage, poor



Colfax soil with hardpan (above) caused this Henrico County pavement failure. Below, a soil scientist looks over building progress of Henrico High School. The site and exact location of the buildings were decided after a soil survey.

drainage, and rock. Engineering tests will soon be made to determine costs of site preparation and foundation design and construction.

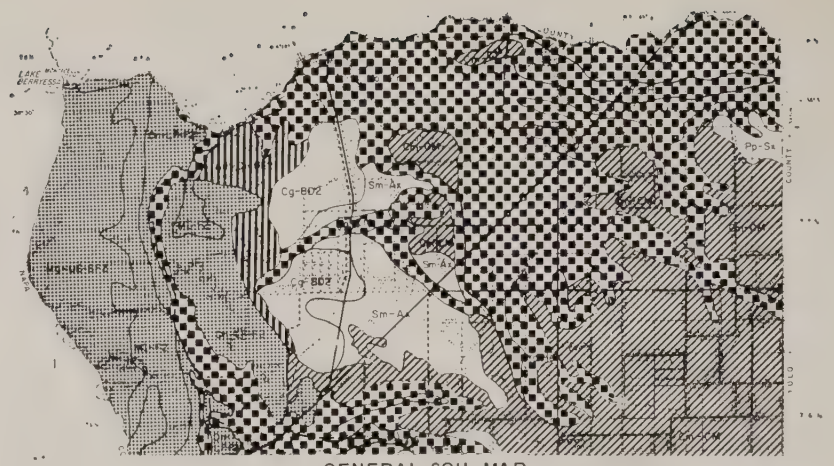
In yet another field, the County Utilities Department has received a drawing showing the soil, hardpan, and rock for more than 60 miles of water and sewer lines. The soil maps help engineers to plan utility lines so as to avoid rock when possible and to help the contractor furnish a reasonable bid by determining the amount of rock and hardpan where it does occur. The cost of excavating rock and hardpan ranges from 10 to 20 times that of a normal mineral soil.

E. L. Tarr, Jr., real property agent, says, "The Real Property Department has found it most helpful to have the services of a soil scientist available in making determinations in selections of school sites, fire station sites, sewage pumping station sites, and sewage treatment sites."

The soil survey has provided data on the engineering qualities of soils for 5 miles of road and two borrow areas for road fill. This information has resulted in improved design of roads.

P. T. Rutledge, assistant engineer of the Public Works Department, estimates that use of soil maps and their interpretations in his office has resulted in savings of $120,000 in two different road construction jobs.

The people of Henrico County are well aware of the benefits of soil surveys in building homes, sanitary systems, highways, and for other uses. Their enthusiasm and forward-looking attitude in this matter will enable them to meet future development problems. ♦



GENERAL SOIL MAP

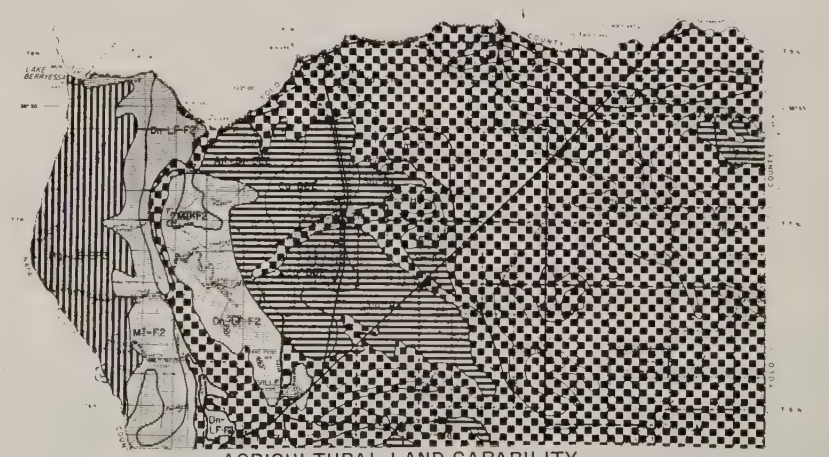
GROUP 1-Areas dominated by very deep, level, well-drained soils of alluvial fans and valleys.

GROUP 2-Areas dominated by clay soils of basins or basin rims.

GROUP 3-Areas dominated by soils with loamy surfaces and dense very slowly permeable clay subsoils.

GROUP 4-Areas dominated by clay on sloping to steep hills.

GROUP 5-Areas dominated by loamy soils on uplands underlain with sandstone.



AGRICULTURAL LAND CAPABILITY

CLASSES I and II — CLASSES III and IV — CLASSES VI and VII — CLASS VIII

LIMITATIONS FOR SEPTIC TANK FILTER FIELDS

Slight — Severe

Corresponding portions of the general soil map (above) of Solano County, Calif., and two single-purpose interpretive maps. Note, for example, that group 2 soils (lower right portion of general soil map) are best for agricultural use but poorest for septic tank filter fields.

Soil Maps in Land Planning

Single-purpose interpretations help guide California's development

By Leonard R. Wohletz
State Soil Scientist, SCS, Berkeley, Calif.

SINGLE-PURPOSE interpretive soil maps made from general maps are an essential tool in long-range land use planning in California.

Countywide maps colored to show suitabilities and limitations of soils for specific purposes are being used by planning officials to guide the location of new homes, industries, transportation, and recreation areas, and to preserve open space and agricultural production, to meet the needs of California's rapidly growing population.

They are being used to help identify areas of prime agricultural land that qualify as "agricultural preserves" under the California Land Conservation Act of 1965.

The Soil Conservation Service, cooperating with soil conservation districts and associated groups, is currently compiling general and interpretive soil maps for the privately owned portions of each county in California.

The colored interpretive maps are used extensively throughout the State in meetings with the State Soil Conservation Commission, county boards of supervisors, soil conservation district directors, planning commissions, regional planning groups, and with other State and Federal resource planning agencies.

The response has been highly favorable and is creating support for completing as soon as possible both the general soil map and detailed soil maps and their interpretations for each county in the State.

Eight counties are exploring means to publish the general maps and to assist financially in accelerating the detailed mapping, interpretation, and publication. The north coastal California and the Central Lahontan Nevada-California river basin survey reports will include general and interpretive soil maps as essential elements in the presentation of land facts.

The nine counties surrounding San Francisco Bay comprise a metropolitan area of 4.5 million acres with a rapidly expanding population. People move in at an ever-faster rate, creating problems related to transportation, sanitation, recreation, and urban sprawl with the resulting loss of the remaining prime farmland.

The Association of Bay Area Governments was set up to prepare a regional plan for the solution of these problems. An element in its planning program included arrangements with the SCS, working with soil conservation districts, to prepare a general soil map and land capability interpretations for the nine Bay Area counties. The association's specific request was for soils data for regional planning, including the place of farming in the total land use pattern.

Landowners, conservationists, planners, and people in general are concerned about preserving prime land for production of specialty crops and for open space in areas of rapidly expanding population. Such land is an irreplaceable asset in California's future. Its pattern of use must be flexible so it can be shifted to meet changing agricultural demands. With each

(*Continued on p. 18*)

A desirable land use pattern results when soil maps identify prime agricultural land to be kept in crop production while residential construction takes place on the slopes which are less suitable for farming.

Soil Surveys Improve Tax Assessments

Court Upholds Values Based on Kinds of Soil

By W. M. Johnson
Principal Soil Correlator, SCS, Portland, Oreg.

"FARM TAX assessment values based on kind of soil are fair, just, and equitable," a Washington superior court judge recently ruled.

The decision came when a group of Spokane County farmers went to court seeking a return of tax payments made under a new appraisal system based on soil surveys.

The "new look" in land assessment began in 1953. Then tax appraisals were made primarily on land sale prices and visual inspection of stubble. County Assessor Wylie W. Brown asked the Soil Conservation Service to recommend improved methods of assessment through use of soil maps.

The SCS report pointed out that the physical land factors that characterize different soils are relatively stable. When these factors, along with research findings and other technical information, are combined with practical farm experience, they provide a sound basis for establshing relative base values for the various kinds of soil. Erosion and other forms of land deterioration can be taken into account, and land values changed accordingly.

As a result, the county and the SCS agreed on an accelerated soil survey. The county provided $28,000 for the program.

The tax assessor's staff, in cooperation with local farmers, has used the surveys to establish a relative value for each kind of soil in the county. They agreed on an assessed tax base value of $45 an acre for the best Spokane County soil. This is 25 percent of the estimated land value. Other soils were assigned lower values in comparison to the $45 maximum. Because the scale is based on productive capacity rather than current land returns, the careful hardworking farmer is not penalized for his extra ability or foresight.

The assessors realize that dollar values may change as economic conditions change. New assessments can adjust to these factors without changing the relative land values. An equality between land values and tax assessments can therefore be maintained.

Today, 90 percent of the county is assessed under this system. Tax officials feel that most farmers approve; Brown himself believes soil surveys provide "the best method there is to assess farmland. Even if other criteria should be included in the future, the soil survey will still remain the principal basis for assessments." ♦

Iowa Taxmen Use Soil Surveys for Fair Assessment

By Joseph A. Phillips and Raymond I. Dideriksen
Extension Agronomist, Iowa State University, and Assistant State Soil Scientist, SCS, Ames, Iowa

THIRTEEN Iowa counties are now using soil survey information to help in tax assessments, and 12 more counties have indicated a strong interest in the idea. Tax officials say they welcome the use of soil maps as an aid to a fair assessment of farmland.

Adams County, Iowa, is one example of how soil surveys have helped equalize the tax burden.

Eldon Roberts, Adams County assessor, was contacted in 1960 by the Soil Conservation Service, soil conservation district officials, and Iowa State University and advised

Gale Boy, deputy assessor for Spokane County, Wash., looks over a field of Larkin soil assessed at $40 an acre under the old method of visual valuation. Across the road, another piece of property was formerly assessed at $30 an acre. Both properties are now appraised at $32 an acre, based on information from the soil survey.

of the county's recently completed soil survey. With the approval of the county board of supervisors and board of review, Roberts worked out a method of using the soil data for appraisal purposes, stressing the soil's productivity and the market value of the land.

The method

Roberts obtained a set of field soil survey maps, at nominal cost, from the Soil Conservation Service and a crop suitability rating for the area developed by Iowa State University and SCS. The suitability ratings are based on actual crop production and range from a top of 100 for maximum productivity to a low of 5. The assessor then placed a value on each soil type based on past sales records. Thus, each crop suitability rating had a base value set by the county assessor.

The areas of different kinds of soil on each 40-acre tract were measured on the survey field sheets and the amount of each soil type noted. Deductions were made for gullies, ditches, and other features that reduce land value. The acreage of each soil, after deductions, was multiplied by the appraisal factor, and the average value of each 40-acre tract was recorded. The figure was adjusted up or down to compensate for nonland factors such as buildings, access to roads or markets, and the general neighborhood.

Assessment by the new method began in 1961 and was completed in 1964, at a cost of $6,000. It was a "slack time" project for the office. Roberts points out it could be completed in a much shorter period if done on a full-time basis.

The results

Did the re-evaluation make tax assessments in Adams County more equitable?

The total assessed value remained the same. However, there was a wide *range* of assessed value between 40-acre tracts. Productive soils were appraised at about the same value as previously; poor soils often received a lower assessment. In the intermediate soils, there was a high proportion of assessment changes.

Eldon Roberts, Adams County assessor, explains the new method of tax appraisal to two local farmers, Jerry Peckham (left) and Neil Wilmarth (center).

Did landowners in Adams County accept the re-evaluations? By and large, yes.

According to Roberts, 200 farmers out of a total 1,200 asked for explanations of the new rate. However, only 10 farmers appealed for a change.

Roberts says community acceptance was due to an intensive information program carried out by SCS and soil conservation district people, the county extension director, the local vocational agricultural teacher, and others.

Roberts adds that in the beginning he himself evaluated several test farms and, at his request, the county board of supervisors and board of review checked the appraisals on a number of farms in both the high and low group. With their backing, the assessor then extended the procedure to the entire county.

Roberts feels the training he and his staff have received in the use of soil surveys increased their ability to make just and equitable assessments. Farmers were impressed by the detailed information available about their land and pleased that seemingly small differences in soils and land conditions were taken into account.

What about future reappraisal of the land? The basic soils information will not change, but owners can expect some adjustments as land features are altered by various uses.

Taxes on farmland may increase through the years, but Roberts believes that, thanks to soil survey information, Adams County landowners will remain a step ahead in the progress towards tax equalization. ♦

Autumn Olive

People in the East, who want to attract wildlife, conserve soil, beautify odd areas, establish plant barriers, or make ornamental plantings, will find autumn olive a valuable plant. The use of this plant is discussed in detail in "Autumn Olive—for Wildlife and Other Conservation Uses" (USDA Leaflet 458). ♦

The Touch of Beauty

Conservation smooths scars of erosion and clothes barren hills in mantle of green

If you are lucky, as you drive by the Double D Ranch, you may see a spirited stallion racing with the wind.

THE STORY of the princess who kissed the frog and turned him into a handsome prince is no more miraculous than the story of Lafayette County, Miss.

But the magic touch in this case is soil conservation, which in a span of 25 years has laid a mantle of pines and green pastures over the barren and eroded hills.

As an example, let us take the Double D Ranch just west of Oxford—one of the few thoroughbred racehorse ranches in Mississippi.

Here, handsome board fences of treated pine and hardwood enclose lush pastures on which the brood mares graze. And in the upper paddock—with full mane flying—you may see a famous Kentucky stallion racing with the wind.

Rare sights, you say, but think what this land once was!

"It was all woods when I came here," says Morris F. Lynch of Chicago, who bought those 112 acres a few years ago and plans to move down permanently one day. "It was scrub oak—gullies—no fences—one pond—a few small patches of cotton."

"The valleys were so filled with sand and silt that farming operations were impossible," adds Travis King, SCS work unit conservationist who helped Mr. Lynch with a conservation farm plan. The hills had bled white, and the scars were deep on the slopes.

As a cooperator with the Lafayette County Soil Conservation District, Lynch has taken these acres of severely eroded land and turned them into fine pastures. Some of the plants he uses are bahiagrass and crimson clover, fescue and white clover, bermudagrass, and lespedeza. In each pasture is a pond which shimmers blue in the sun. Behind the fences is a fringe of woods.

With technical assistance from SCS, Mr. Lynch has also constructed two large desilting basins with pipe outlets to catch the sand and silt that were destroying this valuable bottom land.

Horses like these are new in Mississippi, but the land use changes are not so new. Green hills have been steadily increasing throughout the State since the Soil Conservation Law was enacted in

Pasture improvement (left) has transformed many acres of gullied land into pleasing pasture scenes, like the farm of C. F. Taylor, deputy commissioner of the Lafayette County District. In 1965 more than 400 acres of eroded land were planted to pastures by cooperating farmers. At right, Morris F. Lynch holds a California-bred brood mare, and Double D Ranch Manager R. A. Leister holds her 2-month old colt.

1938. And, although many people may not be consciously aware of it, soil and water conservation has done much to change the landscape into one of beauty.

The pictures on these pages illustrate the new look of the rural landscape in an active soil conservation district. ♦

C. F. Taylor (right) worked out a conservation farm plan for Sunset Hills, a once prosperous antebellum plantation which had "gone to seed." Here is Mr. Taylor with SCS Work Unit Conservationist Travis King beside a farm pond which has been purposefully left surrounded with brush to encourage wildlife.

In the spring of 1965, Cooperator John Leslie smoothed the last 5 acres of his once-desolate farm. When he worked out a conservation farm plan 4 years ago, half of his 163-acre farm looked like this. Using flood prevention funds for critical area treatment, he bulldozed the land, fertilized, and seeded it. Now he has a registered Angus herd on the pastures.

Through the Yazoo-Little Tallahatchie Flood Prevention Program, millions of trees have been planted by the U. S. Forest Service on farms of district cooperators. Now, fine stands of pine are growing in the gullies, beautifying a once-desolate landscape.

This lake—clear blue and fringed with pines—would have been ruined by sediment 4 years ago. Now, Mr. Leslie's family and friends enjoy its beauty from a weekend cottage built of lumber cut off the farm. The casual visitor would find it hard to believe that surrounding land was once marred with gullies too deep to cross.

Engineers Use Soil Surveys for Highways

By W. R. Elder
Soil Scientist, SCS, Temple, Tex.

SOIL SURVEYS can have great value to highway engineers by providing them with accurate, relatively inexpensive information on the soil over which their roads will pass.

As one Texas highway department engineer remarked about a 3-year old road, "That highway would still be in the testing laboratory if we hadn't used soil maps."

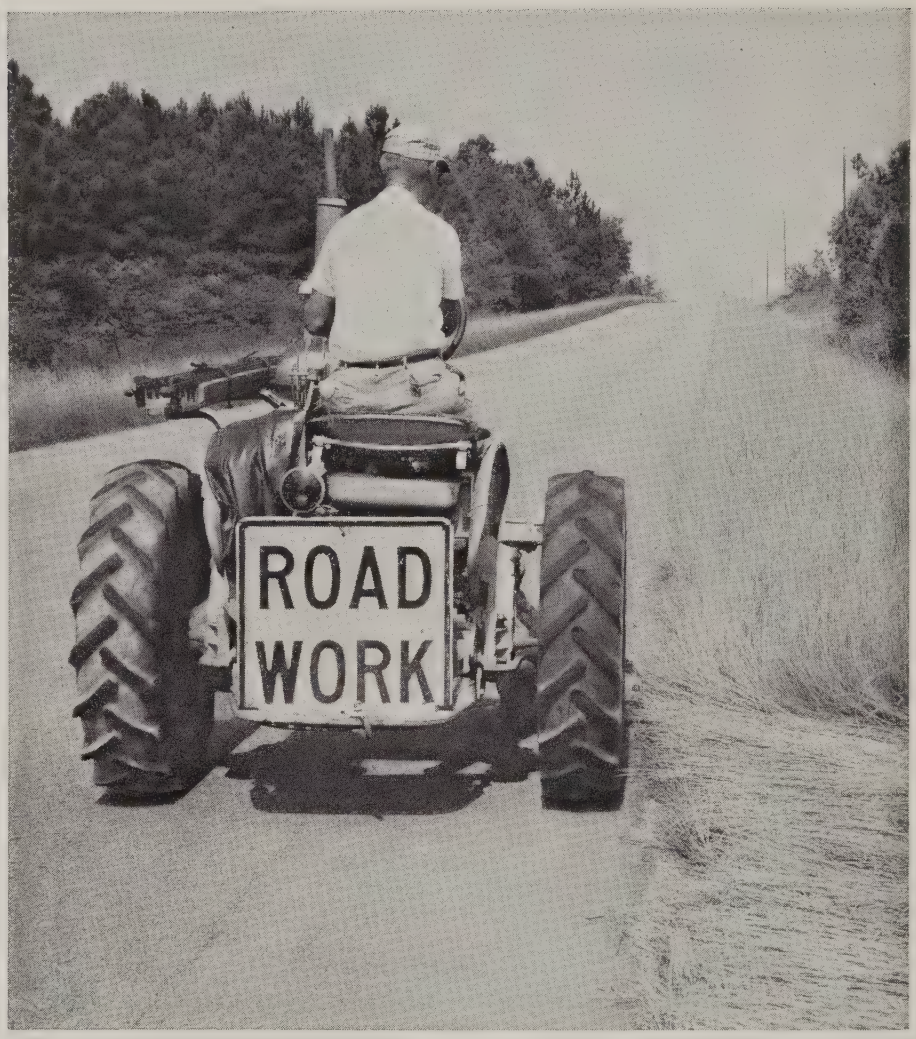
Highway construction is based on soil surveys in the preplanning, planning, and construction phases. In the first stage, a proposed highway can be plotted on a soil map. This will indicate some of the major problems to be expected and, based on previous experience, it will provide the basis for a cost estimate.

In the planning stage, laboratory and other tests are needed to provide the necessary design data for contract specifications.

Saving on samples

But the number of borings and samples needed along a route can be greatly reduced if the engineers have a map showing the extent of each kind of soil. Instead of the usual sample every hundred feet or so, one or a few samples can characterize up to a mile of a single kind of soil, especially if supported by information from earlier samples and experience with the same soil at other locations.

And in the construction phase, soil survey information can help determine the limits of compaction, density, and other requirements for contract work.



Planting a road shoulder with grass, flowers, or trees helps control erosion, cut maintenance costs, and beautify the area. Success of the planting—here bahiagrass—depends on correctly matching kinds of plants to kinds of soils.

Ideally, a highway should have hard rock under the roadbed, which would require neither cuts nor fills. The right-of-way should have fertile soil that will support a good cover of grass or trees. But, unfortunately, stretches of even a few hundred feet that meet these requirements are rare.

Modern highways are precisely designed engineering structures which consist essentially of three components: (1) The underlying soil or geological material, called the subgrade; (2) the base materials of gravel, crushed rock, or lime- or soil-cement-stabilized soils; and (3) the actual road surface or pavement.

The load-bearing characteristics of the soils under a highway determine the thickness and kind of base materials needed. Engineers must decide whether to haul gravel or crushed rock over long distances for the base area, to lime-stabilize clayey soils, or to use soil-cement to strengthen onsite sandy soils and thus reduce the thickness—and therefore the cost—of the crushed rock or gravel base.

Soil maps used for highway construction planning can be the regular soil survey maps or maps made to show strips along the highway right-of-way. Where less detail is required a soil map for an individual county can be used. Where highway departments have built up a file of test data by soil series, generalized county maps have proved very useful and effec-

tive in helping to estimate overall costs and to fill gaps in soils information for which no data are available.

Highway construction uses large amounts of sand, gravel, crushed rock, and bonding clays. These materials must be of high quality and, for cost reasons, should be located as close as possible to the highway under construction. Both soil and geological maps are of great assistance in locating such materials.

Landscape gardeners

There is a final use for soils information in road construction. Highway departments are the largest landscape gardeners in most States. Highway rights-of-way are planted to grass, wildflowers, trees, and ornamentals to make roads safer, to prevent erosion, and to make the surroundings more attractive. Knowledge of the soils, their fertility, and suitable plants for the area are vital for this purpose.

Highways rest on soils. From the first tentative estimate to the finished product, a highway's location, success, cost, materials, and surrounding final appearance all depend on the soils beneath and how well they are interpreted and used. Soil surveys can be a major tool in planning and constructing today's superhighways. ♦

From salt marsh to piny woods . . .

Louisiana Cattle Drive Enables Rancher to Use Forage in Season

By Thomas N. Shiflet
Range Conservationist, SCS Alexandria, La.

IF, IN south Louisiana, you see a cattle drive in progress, it is not a reincarnation of the "Old West." It's the real thing.

These modern-day cowboys aren't driving them for fun, either. The drive plays an important role in management of the range resources of the area.

One rancher, J. B. Meaux of Cameron Parish, trails more than 450 head 80 miles twice a year. He and his mother, Mrs. Jimmy Meaux, operate a large salt marsh ranch near Creole.

In 1962, he trailed his cattle to the pine woodland area to escape a plague of mosquitoes and other insects that made life unbearable for them. Since that time, he has moved the herd regularly.

Best for both

This grazing system proved best for both the marsh and woodland grazing resources. The salt marsh is excellent winter range. The slash pine and longleaf pine woodland is best in the spring and summer.

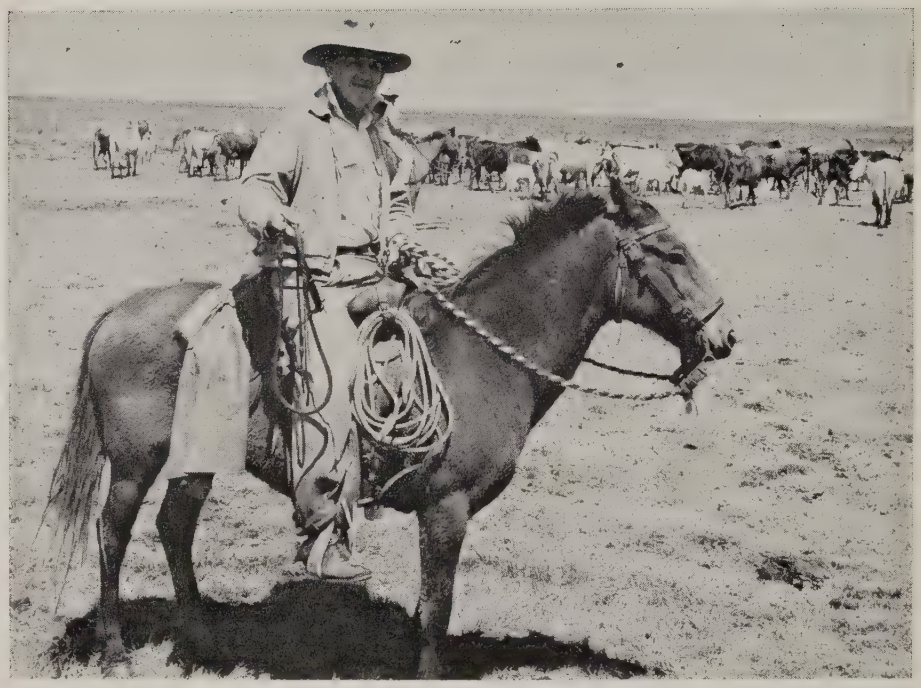
Meaux's system allows complete deferment of the marsh during the summer, assuring an abundance of forage for winter use. His marsh range has improved an average of one condition class since he started the rotation.

Spring and summer use of the woodland takes advantage of its peak forage quality. Salt and mineral supplements, which are not needed on the marsh, are necessary on the woodland range. Cattle are moved before protein content of the forage falls to a low level. The woodland forage is permitted to get good growth before the cattle are put on it. Then it gets rest after they are removed in October and before frost in mid-November.

Most of the grazed woodland is leased from the J. A. Bel Company, a large timber grower. The lumbermen realize that they have a secondary resource in grass. Proper grazing is not harmful to the timber; in fact it benefits the

Cattle start 80-mile trek to winter range with a swim across the wide Calcasieu River.

A "cajun" cowboy displays the braided reins that are the badge of the range in the Louisiana marsh country.



woodland by reducing the fire hazard and helping to suppress unwanted hardwoods.

Meaux perfers to drive his cattle rather than haul them by truck. The drive takes about 3 days. The herd swims the Calcasieu River near Lake Charles at a crossing where the river is about one-fifth mile wide. After a few drives, the cows know the way and they swim the river without difficulty.

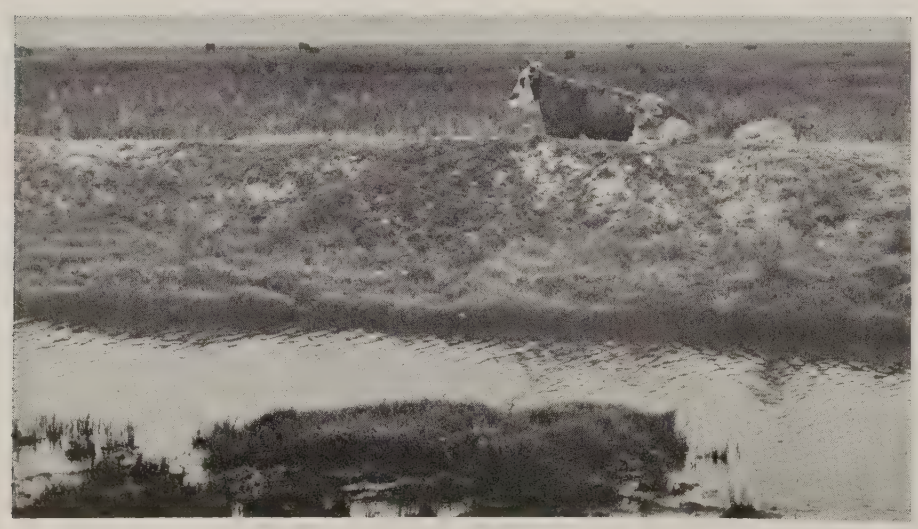
Meaux lists many advantages of the rotation system over year-long grazing of the salt marsh. Cows and calves which were once killed by mosquitoes (that's right, killed) during the summer are now saved. He reports that his marketable calf crop has increased by 20 percent and average calf weights by 40 pounds since 1962. He has been able to increase his cow herd without overgrazing either range.

Both units have conservation plans developed in cooperation with the local soil and water conservation district. Meaux has been cooperating with the Gulf Coast District on the marsh ranch since 1950. A plan was developed on the woodland tract with the Calcasieu District in 1963. Both Meaux and the Bel Company are participating in this plan.

Meaux has found great difference in grazing the two areas. Proper use on the salt marsh requires 4 to 5 acres per animal unit equivalent year long, compared to 15 to 20 acres on the woodland.

Grazing distribution is a prob-

At summer's end, cattle are rounded up from the woodlands and headed back to the marsh.



A cow and calves rest on a cattle walkway, one of a series of low ridges of earth thrown up at intervals through the marsh to give firm footing and distribute grazing evenly.

lem on both ranges, but ways of achieving it are different. Cattle walkways are used on the marsh. On the woodland, strategic location of water and of salt and mineral feeders keep the stock properly scattered. Cattle must have salt and mineral when grazing woodland forage, but they ignore it on the marsh because of salt on the vegetation and the quality of forage.

Meaux' grazing program is aimed to get the best management for his livestock and grazing resources. The annual cattle drive is just a practical way to match grazing use to seasonal forage production for year-round livestock operation. ♦

Plastic Netting Tested on Dunes

PLASTIC NETTING is being tested as a new material to stabilize the thin line of sand dunes that protect New Jersey's multimillion dollar coastal recreation areas from surf and wind.

Comparisons of sand traps made of the new polyethylene netting with the old-style wood slat fences are being made by the Soil Conservation Service and the State of New Jersey at Island Beach State Park.

In a recent test, a 1,000-foot-long section of the netting was strung on posts set at 7-foot intervals to form a 4-foot high barrier along the shore. A 200-foot section of wood fence was installed nearby.

Sand accumulated along the plastic netting to a height of 4 feet within 3 to 4 months. At the end of a year, the netting was still in good condition.

By contrast, the wood fence collected only 2 feet of sand during the same period.

The tests showed that 5/8-inch mesh netting was the most efficient size for trapping sand. The plastic fence could be erected at the rate of 100 feet per man-hour, three times as fast as wood-slat fencing.

A 4-foot-high plastic netting fence was covered to the top with sand in 3 months.

In addition, the plastic netting weighs only 13 pounds a 100 feet, compared to 100 pounds for wood slats, and it is easier to store, transport, and unroll.

The SCS and manufacturer are pleased with the experiment, and plan to make a larger test on a Long Island, N. Y., beach in the near future.

Considering the results to date, it would appear that plastic netting might have other conservation uses, such as for temporary windbreaks on muck land, trapping snow on ski trails, and protecting newly seeded areas from wind erosion.—DONALD G. BURBANK, *State Soil Conservationist, SCS, New Brunswick, N. J.* ♦

Water is Theme of SCSA 21st Meeting

"Water and America's Future" is the theme of the 21st annual meeting of the Soil Conservation Society of America at Albuquerque, N. Mex., on August 14 to 17.

Among the speakers will be Secretary of the Interior Stewart Udall; Gladwin Young, associate administrator of the Soil Conservation Service; Henry Caulfield, executive director of the National Water Resources Council; Robert D. Weiger, chief of the Department of Health, Education, and Welfare's Office of Pesticides; and New Mexico Governor Jack Campbell.

Thirty-eight papers will be presented in technical meetings of the convention, and winners of 15 conservation scholarships and 6 National Merit Awards in Conservation will be announced.

The 11,000-member Soil Conservation Society of America was organized in 1943 to "advance the science and art of good land use." The organization publishes the *Journal of Soil and Water Conservation.* ♦

Land Planning

(*Continued from p. 9*)

new foundation, a little more of the pattern is set in concrete.

The California Conservation Needs Inventory showed that in 1960 there were 475,000 acres of class I and II (prime land) used for agriculture in the nine Bay Area counties. This report estimated that 155,000 of these acres would be urbanized by 1975. Projections are that essentially all of the remaining 320,000 acres of prime agricultural land will be urbanized by the year 2005 unless present trends are changed.

The California Land Conservation Act of 1965 provides for preserving prime agricultural land by continuing to tax designated qualifying areas (preserves) on an agricultural base if the landowner wishes to avail himself of the provisions of the act. Prime agricultural land is defined as land in capability classes I and II or land that has produced $200 or more an acre gross agricultural income in 3 of the last 5 years. The general soil and capability maps are being used to help identify larger areas that qualify for such special treatment.

Throughout the State trends toward broader land use planning have emphasized the need for greater attention to interpretive soil maps. Conservationists and planners are well aware that land resources vary widely in their capabilities for specific uses, acres are not interchangeable, and specialty-crop land is scarce. Location, climate, and soil properties must therefore enter into calculations and plans for orderly growth and development of communities, counties, regions, and the State.

We are beginning to appreciate the meaning of "Under all is the land." The basic principles of soil science are similar for farm and nonfarm uses; the difference is in number and kinds of soil interpretations. The same properties and qualities of depth, texture, permeability, fertility, and drainage are important for planning of parks, roads, and developing urban areas as well as for their more familiar use in agriculture.

Soil maps and interpretations are essential in planning all land uses. They should be at hand when broad land-development patterns are being formulated.

General soil maps, of course, are no substitute for detailed surveys or onsite examinations. Because of the complexity of soils as they occur in nature, any area shown on a general map may contain smaller areas that differ from the prevailing characteristics of the area. The interpretations, therefore, apply only to broad areas and not to specific sites.

General soil maps are prepared largely by selection of information from completed detailed surveys. Unmapped areas are covered by reconnaissance field studies to serve as a guide until detailed surveys are available. Line maps at a scale of 1 inch equals 2 miles are used as a base. The general map of a representative county has about 25 soil separations based primarily on differences that influence soil interpretations for a variety of purposes.

Information on general soil maps must be explained and interpreted for the needs of many potential uses. For this, single-purpose interpretive maps are colored to show three or more classes of soil use potentials and limitations for the selected purpose. Such interpretations may include: (1) Agricultural land capability, (2) range sites, (3) woodland suitability groups, (4) soil limitations for various recreational uses, (5) hydrologic soil groups, (6) soil erosion hazards, (7) soil shrink-swell behavior, (8) ratings for foundations, (9) soil limitations for septic tank filter fields, and (10) pipe corrosivity, and others.

The single-purpose maps follow the standard color pattern for land capability classes: Green, slight limitation; yellow, moderate; red, severe; and blue, very severe. Specific criteria for mutually exclusive categories have been developed for each interpretation.

Land use objectives

The philosophy underlying this type of land use planning needs to be expanded and broadened if prime farmland is to be maintained as a vital part of the California of the future. Support is growing in the State for the type of planning which seeks the best relationship between resources, economic pressures, and social needs. Such desirable land use planning will:

(1) Maintain prime agricultural land for farming and open space. This will mean California's valuable speciality crops can continue to be grown. This will also provide the green spaces and open countryside we want and need for ourselves and our children.

(2) Route highways and other public facilities in conformance with good land use patterns.

(3) Guide urban development so good farmlands are used for crops while the scenic, flood-free terraces, benches, and rolling hills are used for housing developments.

(4) Place parks and wildlife where water, scenery, and soils are better adapted to recreational uses than to farming or housing.

(5) Use the steeper and more shallow soils for pasture, range, and woodlands.

Fundamental to all of these plans, of course, is a good knowledge of the soils involved.

The challenge to all landowners, citizens, planners, and government agencies is to project and develop land use patterns that are in harmony with the soils and landscape —that will provide a place for farms, factories, towns, and open spaces in proper balance with society's needs.

Land use plans for tomorrow and the distant future are needed

before today becomes yesterday, and we belatedly realize that another opportunity was missed in our rapidly changing times. Single-purpose interpretive soil maps clearly present the suitability of the land for specific purposes, general soil maps for broad framework planning, and detailed maps for field, farm, and tract planning. They are proving helpful in evaluating alternative land uses to arrive at a desirable pattern for future development. ♦

Water and Grass Farmer's Aim

PARALLEL TERRACES, grassed waterways, field border plantings, and grass rotations help put into reality a plan of an Alabama farmer to have all water leaving his farm run through grass.

It all began back in 1950 when E. F. Washburn, whose 110-acre farm lies atop Sand Mountain near Sardis, became a cooperator with the Etowah County Soil Conservation District. Starting with 60 acres and later adding more, he developed a complete soil and water conservation plan with SCS help and received cost-shared assistance through the Agricultural Stabilization and Conservation Service.

Washburn built parallel terraces and waterways and established conservation cropping systems. He planted Kentucky 31 fescue grass, keeping it on the land from 3 to 5 years, and rotating it with row crops.

While the land is in grass, he uses it for grazing and hay. Excess from his pasture and cuttings from his waterways provide all the hay Washburn needs. One year he was able to harvest more than 900 bales.

When a field is in row crops, he manages the residues to protect the soil and increase its moisture-holding capacity. Each fall he plants vetch for a winter cover crop.

E. F. Washburn has been chosen by the board of supervisor's as an adviser in the Etowah County District, as an ASCS County Committeeman, and in 1961 he received the Goodyear "Outstanding Conservation Farmer" Award.

His conservation system boosts farming efficiency, Mr. Washburn says. In addition to improving and conserving the soil, it shortens the time required to cultivate row crops, eliminates most short rows and turn rows, and the waterways and borders provide turning room for machinery. ♦

E. F. Washburn points to a newly seeded waterway that will drain into small pond in background. Sam Burnette, Etowah County SCD supervisor, and A. T. Webb, SCS work unit conservationist, look on.

A Man and a Project Get Watershed Awards

A manufacturer's agricultural representative who recognized the potentials of the small watershed program in the mid-1950's and made himself an expert in helping communities organize and plan for action was rewarded with designation as "Watershed Man of the Year" at the 1966 National Watershed Congress in Oklahoma City.

Elmer L. Smith of Caterpillar Tractor Company of Peoria, Ill., was cited for his contribution to progress through his advice on publications, displays, motion pictures, and slide presentations, and through counseling with his own organization and others on advertising themes promoting watershed protection and flood prevention.

The Congress' "Watershed of the Year" plaque went to the American-Dry Creek Project in north central Utah for its success in marshaling a broad cross section of community interests to reduce heavy flood damages and improve the resources of the watershed. ♦

Roads Disturb Soils

Thousands of miles of freeway, highway, country road, and forest access roads are built in the United States each year. Nearly every foot of this construction is in a watershed, and except for overpasses, viaducts, and bridges, most of it involves soil disturbance. ♦

Fee Fishing Pays in Prime Free Fishing Region

"FEE" FISHING on the Olympic Peninsula in Clallam County, Wash., just minutes from free fishing! Bunk? John Elwick and his wife Lila don't think so.

Three years ago the Elwicks, with assistance from the Soil Conservation Service, built a dam across Jimmy-Come-Lately Creek, which measured 15 feet high and 150 feet long. It formed a 410-foot long 2-acre lake.

In the spring of 1963, John stocked the lake with 6,000 rainbow trout fry and offered them supplemental food. Encouraged by the results (6- to 8-inch trout by the end of the summer) he purchased another 16,000 fry in 1964 for rearing in a 20 x 50 x 4-foot flow-through pond built below the dam and supplied with water from the lake.

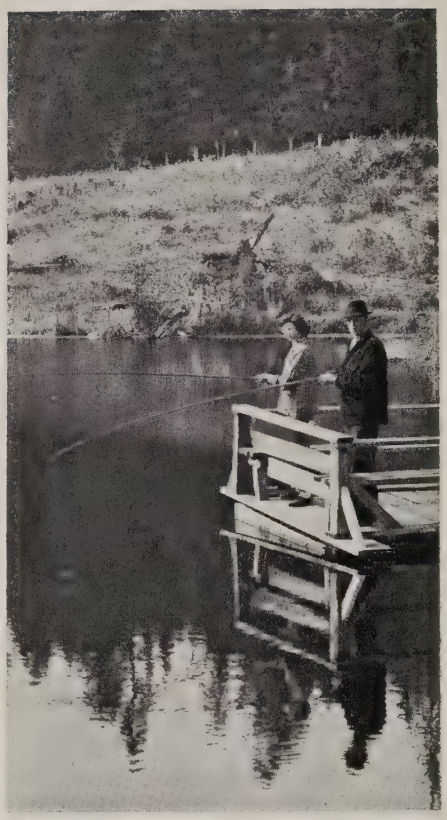
Here fish were fed and cared for until they were 6 to 8 inches long. They were then moved to the fishing pond or sold to licensed pond owners for stocking.

John and Lila opened their fish pond to fishing on Labor Day, 1964. By June 1, 1965, the end of the off season, they had taken in $750, most of it from "fee" fishing. A small part came from selling fish to other pond owners for stocking. By Labor Day, 1965, they had received $1,000 from fishing alone.

Customers are mostly elderly people who can no longer "fight the brush" or handle a boat, and grandparents with their small fry. Young couples with small children have begun to frequent the enterprise.

"Some customers come again and again," says Mrs. Elwick.

"Adults don't say too much, but children—you should hear them whoop and holler! Parents enjoy themselves too, but aren't as exuberant as the kids."



John and Lila Elwick's home overlooks their fish pond with the Olympic National Forest in the background. Two customers (r.) try their luck in the placid water.

Customers are charged by the size of the fish: 8 inches and under, 25 cents; 8 to 10 inches, 50 cents; 10 to 12 inches, 85 cents; and 15 inches and over, $1.50.

Fishermen here don't need a license, and there is no limit beyond the pocketbook.

The Elwicks furnish poles and bait and even clean the catch. One couple came to catch a few fish for dinner and wound up with 50 because they didn't want to stop fishing.

In 1952, the Elwicks bought their 80-acre farm, southeast of Sequim in a valley nestled below the majestic fir-clad Olympic Mountains.

It was largely brush and stumps, with a few acres of cleared land. Most of the land is cleared now and seeded to hay and pasture. Seven acres are irrigated from the fish pond in accordance with a conservation farm plan.

John and Lila have a small but growing beef herd. When John, a journeyman steamfitter, is away, Lila looks after their 2,000 hen laying flock, feeds the fish, and waits on the customers.

As yet the fish pond makes a minor contribution to their income. But the Elwicks are looking forward to the day when they can take their own eggs and hatch their own fish. When that day comes, John can lay down his tools and stay on the farm.—ALLEN D. BUSENBARK, *Work Unit Conservationist, SCS, Port Angeles, Wash.* ♦

Neighborhood Youth Corps

Some 894 boys in the Neighborhood Youth Corps worked during the summer of 1965 on survey crews, flood restoration, recreation projects, and as aids to professional personnel in soil conservation districts. ♦

CONSERVATION PROFILE

Ralph L. Easterbrook

Massachusetts

Longtime conservationist looks to future needs

"MR. CONSERVATION of Massachusetts" might well be another name for Ralph L. Easterbrook of Dudley, who has served for 19 years as chairman of the board of supervisors of the Southern Worcester Conservation District.

One of his first undertakings in that position was to call together interested farmers to meet at his farmhouse's sun porch. Today some of the early Soil Conservation Service people say, "It was his guiding hand that helped us gain early acceptance of our technical work in the 26 towns of the district." Mr. Easterbrook was always willing to discuss conservation work with people from all walks of life.

On his own diversified dairy, fruit, and turkey farm, he held demonstration meetings to encourage neighbors to establish conservation practices. He constructed three ponds, removed stone walls, and constructed waterways on his own farm. Today he proudly points to his well-kept buildings and farmland, which is now under the active operation of his son.

In his 19 years as board chairman, Mr. Easterbrook guided the district program at Farmers' Field Days, which attracted as many as 15,000 people. He helped direct the annual District Tree Program which distributed more than 200,000 tree seedlings.

When the Watershed Protection and Flood Prevention Act became law, he was a staunch supporter of projects as a means of protecting towns from such floods as hit Massachusetts in 1936, 1938, and 1955. His efforts contributed to having the district cosponsor the Upper Quahoag River Watershed Project.

Ralph Easterbrook was the first secretary-treasurer of the Massachusetts Association of Conservation Districts. He has been active in county and State Farm Bureau work, a member of the county ACP committee, a supporter of county extension work, and, in his own community, a selectman and a member of the finance and zoning boards.

"Supervisor Emeritus" is the title bestowed on Mr. Easterbrook by fellow conservationists of his district "for his leadership in promoting good land use."

At a recent district supervisors' meeting, he said "There is more work to be done in assisting towns with public recreation areas, school sites, and seeing that housing developments use the land within their capabilities."

"Mr. Conservation," who is now 76, is encouraging the conservation district board to develop new programs to assist town conservation commissions and other town officials, as well as farmers, plan for the future use of soil and water resources. ♦

Urban Environment Is Educators' Topic

"CONSERVATION EDUCATION in Urban Environments" is the banner under which members of the Conservation Education Association will gather for their 13th annual conference, August 14 to 18, on the campus of Bridgewater State College, Bridgewater, Mass.

This year, conferees will give special attention to techniques for teaching conservation in the urban environment. They also will consider from the viewpoint of education several aspects of quality of environment.

Wilson F. Clark, chairman of the Division of Science and Mathematics at Eastern Montana College, is president of the association. Among the objectives of the organization are the following: (1) To develop effective conservation programs in schools, and with adult and youth groups; (2) to encourage the training of teachers in conservation concepts, practices, teaching methods, and techniques; (3) to provide leadership in forming conservation education policies; and (4) to stimulate the production and use of accurate and understandable conservation teaching aids.

Among the members of CEA are teachers, curriculum specialists, school administrators, Federal, State, and local resource agency personnel, and private conservation organization representatives as well as private citizens with an interest in wise use of natural resources. ♦

Land Use Information, a Critical Survey of U. S. Statistics Including Possibilities for Greater Uniformity. By Marion Clawson with Charles L. Stewart. *1965. Resources for the Future, Inc., Washington, D. C. (Johns Hopkins Press, Baltimore). 402 pp. $6.*

The work of a distinguished committee of 30 persons sponsored by Resources for the Future provides the basis for this book.

The title may mislead readers to expect to find both information and statistics about land use. They will find neither.

The first half of the books sets forth some definitions and concepts in search of an "ideal" set of land use data. However, the "ideal" seemed to elude the committee so that in the last chapter they were willing to settle for "an attainable system of land data" that would at least "be built on logical concepts."

The most useful part of the book to those who must depend upon the "hodge-podge" of existing data is found in the appendix.

Appendix A gives a particularly interesting and usable listing of dates and events in United States land history that affect needs for land use information. Other chapters in the appendix describe the kinds of data collected by the Bureau of Public Roads, Forest Service, Soil Conservation Service, Economic Research Service, Statistical Reporting Service, Bureau of the Census, and Housing and Home Finance Agency.

Nobody is likely to disagree with the case Clawson and Stewart make for more and better land use data. Even though an exact prescription for an ideal system is not made, any serious efforts toward amendments will find some valuable spadework already done. —Gladwin E. Young, *Associate Administrator, SCS.*

New Publications

Has the United States Enough Water? By A. M. Piper. *1965. U. S. Dept. of Int., Geol. Surv. Water-Supply Paper 1797. 27 pp.; 3 maps in pocket.* Building on previous studies, the author carries calculations of water supply and demand to more concrete and local answers than have been available previously.

The results are finally expressed in terms of million gallons a day per square mile. Three large maps show average precipitation, surplus or deficiency of precipitation compared to potential evapotranspiration and stream runoff for the 48 States, and tables summarize data for 19 drainage regions similar to those used by the U. S. Senate Select Committee on National Water Resources.

"With an appreciation that he may be oversimplifying, the writer ventures that the United States can be assured of sufficient water of acceptable quality for essential needs within the early forseeable future, provided that it (1) informs itself, much more searchingly than it has thus far, in preparation for the decisions that can lead to prudent and rational management of all its natural water supplies; (2) is not deluded into expecting a simple panacea for water-supply stringencies that are emerging; (3) finds courage for compromise among potentially competitive uses for water; and (4) accepts and can absorb a considerable cost for new water-management works, of which a substantial part will need be bold in scale and novel in purpose."

Development of a Procedure for Estimating the Effects of Land and Watershed Treatment on Streamflow. By A. L. Sharp, A. E. Gibbs, and W. J. Owen. *1966. USDA Tech. Bul. 1352. 57 pp., charts and maps. $0.55.* This publication reports the results of a 5-year study in the Great Plains area by an interagency "work group" headquartered at Lincoln, Nebr.

"Overall, the many investigations carried out demonstrated that a procedure, based only on statistically significant results obtained from studies of river basins and research watersheds, could not be developed. Yet, the evidence on the whole indicated that conservation measures such as contouring did affect onsite runoff, and it is self-evident that, in drier areas, storage in ponds and reservoirs, drainage of potholes, and irrigation affect onsite water yield. Since a procedure could not be demonstrated statistically, a rational procedure was developed."

Although the report is concerned mainly with methodolgy, it does give interesting insights into the effects of various conservation treatments on streamflow.

Geography of Coastal Deserts. By Peveril Meigs. *1966. UNESCO, Paris. 140 pp., 14 maps. $6.50. Distributed by UNESCO Publications Center, New York.* Report No. 27 of UNESCO's Arid Zone Research Program treats the "geographic potentiality" of coastal deserts of the world, the nearest to the United States being in northwest Mexico. Geographic potentiality "is construed as meaning the total natural environment and the possible uses to which it can be put."

Fish, Wildlife, and Pesticides. By U. S. Fish and Wildlife Service. *1966. U. S. Dept. of Int., Washington, D. C. 12 pp., illus. $0.10.* A general statement of the Fish and Wildlife Service's position on the use of pesticides and a layman's summary of the agency's research on the effects of pesticides on wildlife.

Handbook of Outdoor Recreation Enterprises in Rural Areas. By Robert S. Crites. *(1966). USDA, Farmers Home Administration. 122 pp. $0.65.* A compilation of information guidelines and examples prepared primarily for FHA employees advising potential operators of income-producing recreation enterprises.

Urban Sediment Can Be Controlled. *1966. Interstate Commission on the Potomac River Basin, Washington, D. C. 40 pp., illus.* Proceedings of the winter public meeting, College Park, Md., February 17-18, includes a variety of papers on the problem and its treatment.

Ground-Water Level in the United States 1959-63, Southeastern States. By O. M. Hackett. *1965. U. S. Dept. Int., Geol. Surv. Water-Supply Paper 1802. 265 pp. $1.* Tables of data.

Camping. By U. S. Forest Service. *Revised 1966. USDA PA-502. 16 pp., illus. $0.20.* Describes the resources of the National Forests for camping, with hints on using them.

From the Administrator:

Soil Surveys for Nonfarm Uses

TO ANYONE living near a metropolitan area, the growth of suburbs, shopping centers, access roads, and industrial developments is an obvious and growing fact.

Highways, high-rises, and high prices are hitting the surrounding countryside with explosive impact as, each year, some 1⅓ million acres of our land disappears from fields and pastures to reappear blacktopped and cemented over, chopped into home lots, or veined with the vast underground of pipes, sewers, and cables that mark an industrial society.

This nonfarm use of the land has a direct effect on our soil survey work.

SCS has the responsibility for assisting with soil and water conservation problems wherever they arise.

We have been making soil maps for farm use for more than 60 years. And now, as some of our farmland goes to town, our soil surveys must follow. Because, whether the land is used for corn or construction, it is still necessary to know the kinds of soil and their behavior under different treatments in order that land may be wisely used.

Nonfarm people are realizing this more and more. Their requests to us for soil surveys have more than doubled each year during the past several years. These nonfarm users often report benefits in excess of several thousand dollars an acre. In some instances, they claim, the cost of entire buildings has been saved through the use of soil surveys to locate the proper land for their purposes.

There are many examples of nonfarm uses of soils information in this issue of *Soil Conservation.* I am particularly interested to note that these examples span a range from the complex land use planning problems of the San Francisco Bay region, with its millions of people, to the single purpose of tax assessment in a rural county.

Soil surveys benefit areas of rapid population expansion in many ways. The same principles of soil use and management that lie back of agricultural improvements of the past two decades can be applied as well to the rural-urban space being filled by our increasing population.

What we have learned about selecting soils for farming and forestry can be applied equally well to selecting soils for housing, highways, golf courses, and for other uses. There is no need to put houses where they may slide downhill, settle and crack, or be flooded; or where they cannot be beautified with growing plants.

Soil surveys are a valuable tool for nonfarm land use planners, but they are not the only tool, of course. Surveys do not replace the need for specific onsite testing, once a particular building site is under consideration.

On any map of practical scale, any delineation is likely to include minor areas that do not conform to the described soils, so the user needs to verify important features on the spot before proceeding with costly improvements. In addition, soil descriptions normally are specific only to depths of 4 or 5 feet, so further study is necessary for large structures that might be affected by conditions below that depth.

But, surveys are a basic first step and will often cut down on the cost of later steps in planning and design.

The use of soil surveys for nonfarm purposes is not limited to urban locations, and the benefits do not go exclusively to city people. Much construction of highways, public buildings, residences, and industrial areas takes place in rural settings. Actually, the interactions between rural and urban interests today are so many and so intimate that the old distinctions between town and country are no longer valid.

By using soil surveys, both as a guide for farming and for nonfarm land uses, we have an opportunity to maintain a strong agriculture and to plan and develop new living space with the advantages of both country and city.

Within this space we can have fields, forests, parks, water surfaces, and wildlife areas. At the same time, we can allow enough density of homes to support efficient schools, shopping areas, clubs, and other facilities of modern life. With this kind of planning by local responsibile officials, both country families and city families can have a better place to live.

We are a fortunate country. For the present we have enough land, and enough *kinds* of soil, for all of our many needs—agricultural, industrial, and recreational. But we must use our land wisely, and increasingly that "we" means urban people.

Once land is excavated for building, or blacktopped over for highways, its alternate uses for the foreseeable future have been sharply curtailed or rendered nonexistent. So, mistakes in converting rural land to urban uses are particularly costly.

Land continues to be our basic natural resource. We must continue our planning for all its many uses from the ground up, with soil surveys.

D. A. Williams

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America the Beautiful—Ohio WOODLAND, GRASSLAND, AND WATER CONSERVATION
MONROE SOIL AND WATER CONSERVATION DISTRICT

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Soil Conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

SOIL CONSERVATION ON WOODLANDS—

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SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE

Wooded . . .

Land that's wooded needs the same intelligent consideration in conservation planning as land that grows cultivated crops, forage, or other useful products.

That's why SCS takes note of woodlands, along with other parts of an owner's property, in helping him decide on long-term goals and how to reach them.

Head Woodland Conservationist C. T. "Cap" Prout, detailing the complex aspects of planning a woodland (p. 36), makes it plain that SCS is concerned with conservation *on woodlands*—not primarily with conservation *of trees*.

Growing and marketing or using trees is more specifically the province of foresters, whose help the landowner also needs, once he has committed certain areas to that use.

Basic Soils: To indicate how basic the soil resource is to the way land is used, when it *is* used for growing trees, we invited field men to report their experiences on this topic.

The almost unlimited variety of these relationships is suggested by three articles by SCS woodland conservationists in this issue: On the way soils information is used by woodland managers in the South (p. 27), on soil-site index studies in Arkansas (p. 31.), and on the integration of the Continuous Forest Inventory in the Lake States with soil classification (p. 35).

COVER: A new owner of an old mountain homestead near Cherrylog in the Limestone Valley Soil and Water Conservation District, Georgia, faces the challenge of planning for the best use of his wooded acres.

Soil Conservation

Devoted to the wise use of land and water resources

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Cooperation in Woodland Conservation

SOIL CONSERVATION is the official organ of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. The printing of this publication was approved by the Bureau of the Budget July 25, 1963.

ORVILLE L. FREEMAN — Secretary of Agriculture
JOHN A. BAKER — Assistant Secretary of Agriculture
DONALD A. WILLIAMS — Administrator, Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service, U. S. Department of Agriculture, Washington, D. C. 20250

BEN O. OSBORN, Editor
GEORGIE A. KELLER, Production Editor

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Subscription: $1.75 per year, $2.50 foreign. Single copy, 15 cents. Discount of 25 percent on orders of 100 or more sent to same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D. C. 20402.

Soil Survey as a Tool for Forest Managers

By George E. Smith, Jr.
Woodland Conservationist, SCS, Columbia, S. C.

THE SOIL SURVEY is becoming an accepted tool of forest managers as they intensify the handling of woodland properties for more efficient timber production.

Many operators in South Carolina, as in other States, are turning to soil maps and woodland interpretations provided by the Soil Conservation Service to evaluate woodcrop potentials of their land and to plan conservation and improvement programs.

Many sites presently contributing little to an operator's income are capable of producing wood crops of high volume and quality if appropriate conservation treatments are applied.

For example, the Toumey Estate in Sumter County, S. C., had some "Carolina bay" land which was producing little, either of wood crops or wildlife. The soil, Grady loam, was known to be excellent for growing pine if supplied with adequate moisture without excessive flooding.

So, water management installations were constructed in 1935. Thirty years later, the tract supported a growth of approximately 11,000 board feet an acre, according to plot measurements by the South Carolina Commission of Forestry. The timber was valued at more than $300 an acre. An earlier thinning had already yielded a harvest of pulpwood.

Continental Can Corporation has had similar experiences in Allendale County. Soils information and planning assistance were provided to both companies through the Sumter County and Allendale County soil and water conservation districts.

In another instance, a forest industry in South Carolina requested information through the conservation district from the Soil Conservation Service to help in establishing a sawtimber rotation to produce loblolly pine averaging 16 inches in diameter at rotation age because the mill handled trees of this size most efficiently. Available soil-woodland interpretations provided information needed, and the owner decided to begin a 42-year rotation on this woodland.

Near Darlington, S. C., E. E. Dargan planted Arizona cypress for Christmas trees. He now harvests them on a 5-year rotation. This species and management are successful partially due to favorable soil and water resources.

The kinds of trees and rates of growth depend to a large degree, though not entirely, on soil and water conditions. Pond cypress tolerates excessively waterlogged soils; by contrast, longleaf pine tolerates the dry sands in the sandhills. Thus, the ability of a soil to grow a particular kind of wood crop is a prime concern to both landowner and industry.

Some soils have superior production potentials and are capable of sustaining heavily stocked stands of high quality trees with excellent growth rates. Such soils justify larger capital investments and expenditures to establish, improve, and harvest trees.

Certain soils in the Atlantic coast flatwoods in South Carolina are considered to be highly pro-

Thirty-year-old slash pine, planted on Grady loam where water level is controlled, yields about 11,000 board feet an acre.

ductive. In some locations similar soils are underlain by phosphate marl which increases their productivity by as much as 230 board feet an acre per year, worth $9.20 at current prices.

In contrast, severely eroded soils with firm material exposed on steep slopes, soils with fragipans or other restrictive layers, and deep sterile sands frequently have such low potentials that they are considered unprofitable to private ownership for commercial wood crop production.

The Rayonier Corporation, a forest industry in the Sattilla River Soil Conservation District in Georgia, leased a tract for 66 years with the objective of growing and harvesting two crops of pulpwood. The company forester planned a 33-year rotation based on the suitability of the soils to produce pulpwood, as indicated by the soil survey.

R. B. Cuthbert, engineer (left), and R. E. Haynes, manager, Southern Woodlands Division, West Virginia Pulp and Paper Company, discuss water management plans with the SCS woodland conservationist (the author).

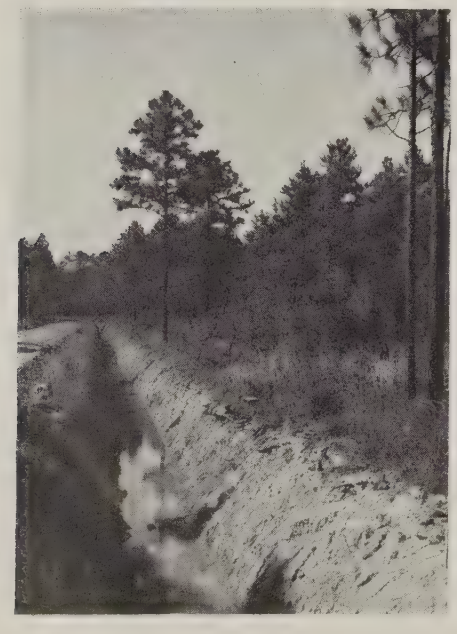
Soil surveys and interpretations which indicate productivity permit the development of cost-return estimates which are invaluable to many industries and individuals.

Current trends in mechanization of woods operations make soil maps useful to indicate where the large machines can be used.

The newly developed tree combine, for example, cannot be operated on steep rocky slopes and is inefficient on waterlogged soils.

This machine is self-propelled and can be operated by one man. It cuts, delimbs, measures, and bucks trees into pulpwood lengths, then stacks and loads the bolts for hauling to the mill. Two of the machines can produce 50 cords of pulpwood in an 8-hour day.

On some sites (left) the water table can be lowered to make access roads and the operation of large machinery feasible. The tree combine (right) fells, trims, cuts, measures, hauls, and stacks pulpwood with a single operator at the controls. It requires smooth and firm terrain for efficient operation.



Operation on waterlogged soils causes inefficiency, excessive equipment wear and depreciation, damage to soils by puddling and compaction, and injury to tree roots and growth. Some timber companies are draining wet woodlands to make mechanization feasible and to avoid the necessity of stockpiling raw materials during dry periods to prevent mill shutdowns during wet seasons. Extensive water management installations have been constructed in South Carolina woodlands by the West Virginia Pulp and Paper Company and others.

Soil maps and interpretations also show owners the opportunities for multiple-use management.

In the Piedmont section of South Carolina a pulp and paper industry owned a tract of planted pines where the ground cover developed a serious fire hazard. Grazing rights were leased to a cattleman at a charge equivalent to the value of approximately one-third to one-half cord of wood an acre per year. Grazing was controlled so that damage to trees was negligible and the fire hazard was reduced.

At Good Hope Plantation in the Coastal Plains near Ridgeland, in the Beaufort-Jasper Soil and Water Conservation District, wildlife is a major product of the woodland. Here "prescribed" or controlled burning is used to maintain suitable habitat for game species. Management treatment is in accordance with soil interpretations.

The State legislative body has appropriated $35,000 annually to accelerate soil surveys and interpretations prepared by the Soil Conservation Service in cooperation with the South Carolina Experiment Station.

The Forestry Study Committee, a legislative committee, recommended the expanded use of soil survey information and interpretations as a way of improving the productivity of forest lands. ♦

Dense shrub buffer rows on the outside edge of this windbreak stopped snow in the trees rather than letting it blow through to pile up around the farmstead buildings.

Windbreaks in '66 Blizzard

Good ones perform well during the storm but poorly designed ones prove liability

By Arthur E. Ferber
Woodland Conservationist, SCS, Lincoln, Nebr.

PROPERLY DESIGNED farmstead and livestock windbreaks will provide good protection from winter winds and blizzards. This was conclusively demonstrated to farmers and ranchers in the central Dakotas and north-central Nebraska during the March blizzard this year.

Old-timers say the recent blizzard was worse than the one experienced by sod-shanty settlers in 1888. The 1966 storm began last March 2 and howled for 3 days and nights of devastation. It was particularly fierce from Bismark, N. Dak., southward through Pierre, S. Dak., to Valentine, Nebr.

Relentless winds whipped 2 to 3 feet of fresh fallen snow into snowdrifts up to 30 feet deep, paralyzing travel and marooning both country and city people in their homes. Winds averaged 60 to 80 miles an hour, gusting to more than 100 miles an hour in places, and reducing visibility to absolute zero.

Windbreaks—their presence or absence—were frequently mentioned by farmers and ranchers after the storm. Poorly designed farmstead and feedlot windbreaks proved to be worse than none at all. These windbreaks generally had too few rows, no ground-hugging shrubs or evergreen species, or they were planted too close to the buildings or areas needing protection.

Poorly planned windbreaks also

The blizzard suffocated and froze many pheasants. Here, a suffocated cock pheasant found near the South Dakota-Nebraska State line.

This road (left) was free from drifting snow, thanks to a properly designed 10-year-old windbreak. Three rows of trees—caragana, Russian olive, and Siberian elm—were planted 180 feet from road. Where trees were planted too near road (right), snowplows had to clear the way.

caused snow to lodge and pile up to leeward and into the farmyards and corrals. The heavy weight of the snow often collapsed sheds and barns and in some cases even bent the frames of farm machinery.

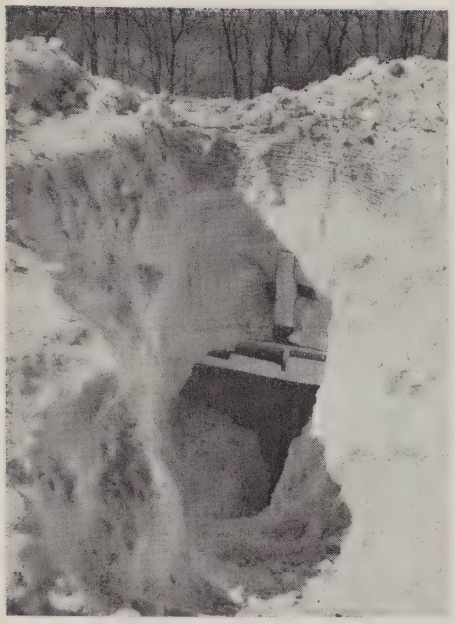
By contrast, it was found that most well-designed windbreaks did an outstanding job of keeping yards, roads, and livestock areas fairly free of snow. These good windbreaks were at least 10 to 12 rows wide and had a 125- to 150-foot gap between the leeward row and the main buildings and livestock lots.

Most of the snow in these areas was lodged and held in the windbreak itself. Normally, in the drier portions of the Plains, snowdrifts in the windbreak are welcomed since they provide extra moisture for the trees and shrubs.

Field windbreaks helped to hold the snow on the croplands and reduce the quantities available for drifting into farmyards and livestock areas. The more even pattern of snow distribution from field to field may have saved wildlife populations in that area.

It was also observed that trees planted too close to roads caused extreme drifting and blockage. Where possible, there should be a

This herd of cattle came through the blizzard in good shape because the 15-row windbreak, set well back from the lot, held most of the snow in the trees themselves. The farmstead (below) demonstrates how not to build a windbreak. This one was too narrow, not dense enough, and planted too close to the buildings. Drifts rose to an estimated 25 feet, and some of the smaller buildings were completely covered.



A North Dakota farmer dug this passageway into a snowbank which collapsed a shed roof and killed 25 head of yearling cattle. Only one was dug out unhurt. The shed was built too close to the windbreak for a storm as severe as the '66 blizzard.

distance of 12 to 15 rods between field windbreaks and winter-traveled roads.

Damage to trees

The March blizzard this year caused severe breakage of limbs and branches of windbreak trees and shrubs, due to the crushing weight of melting snow. Once the owners have pruned off the broken limbs, however, the damaged plants, particularly the hardwoods, will grow new branches.

Pheasant losses were severe in many areas, although some farmers in more protected locations noted fair survival. The wind blew from several directions, and in many cases tree windbreaks drifted full from one end to the other.

Livestock losses from the blizzard were also heavy. Ranchers cooped up in their homes were unable to reach their animals only a few hundred feet away. Experts estimate that losses may have run close to 100,000 head of cattle, sheep, and hogs.

Storm-related losses in production were likewise severe. Live-

(Continued on p. 42)

How Tall the Tree

Cooperative soil-site index studies aid woodland managers in Arkansas

By Max D. Bolar
Woodland Conservationist, SCS, Little Rock, Ark.

A USEFUL TOOL for managers of both private and public woodlands is being developed rapidly in Arkansas through soil-site index studies.

The studies are being carried out by the Soil Conservation Service, the Southern Forest Experiment Station, the Arkansas Forestry Commission, and several wood-using industries.

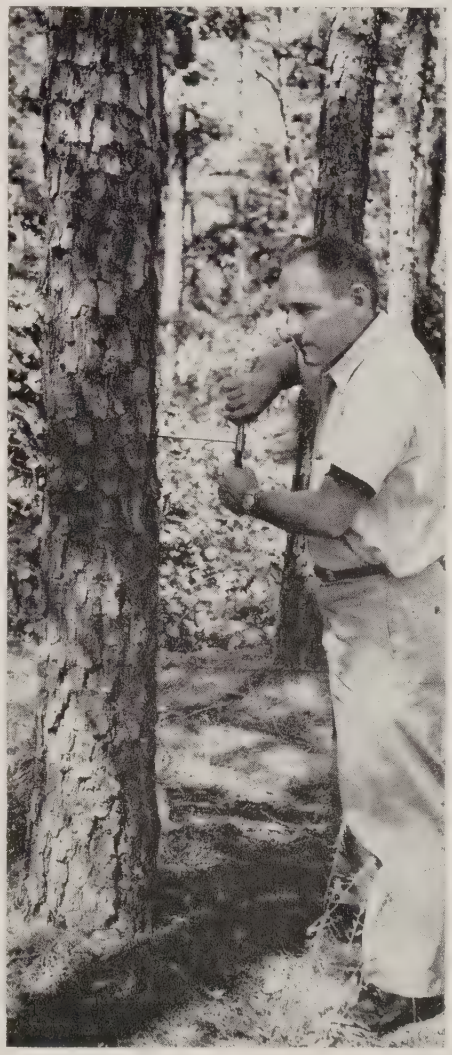
A site index is a way of measuring the potential woodland productivity of woodland soils—that is, how fast trees will grow on a given soil.

Where farmers may say, "This soil will grow two bales of cotton an acre," or "that soil will grow 80 bushels of corn," foresters and soil scientists may say, "This soil is a 100-foot site," or "that soil is a 60-foot site." They mean trees of a certain species on one soil will grow 100 feet tall in 50 years, whereas on another soil the same trees will grow 60 feet tall.

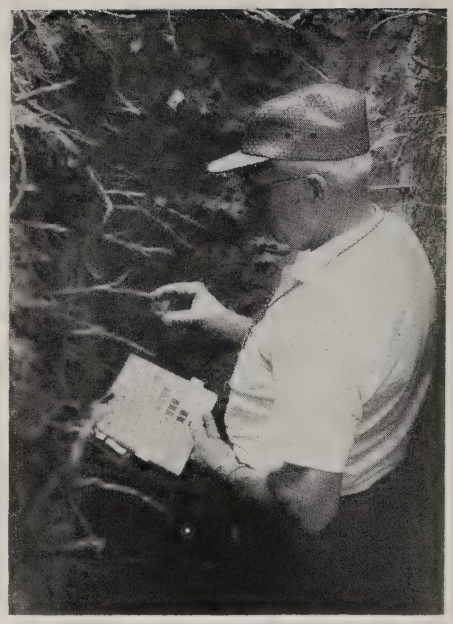
Forester and soil scientist

In a site index study, a team composed of at least one forester and one soil scientist select what both agree is a typical tree and soil site. The soil scientist digs a "grave-size" pit in order to get a profile description for determining which soil he is dealing with. He determines the thickness of the various soil layers and their boundaries; the texture, structure, and consistency of the soil in each layer; the pH (degree of acidity or alkalinity); and many other details about the soil.

The forester selects five of the dominant trees and determines their average height and age. He gets the age by boring into the center of the tree with an increment borer, extracting a plug about the size of a lead pencil and counting the number of growth rings. The forester applies the age and height data to a system of



Bill Freeman of the Arkansas State Forestry Commission uses an increment borer to determine the age of a tree.



Left, Dave Graney (left) and Lee Campbell of the Southern Forest Experiment Station dig a pit for inspection of the soils at this forest site. Right, in the backhoe-dug pit SCS Soil Scientist Tom Millard checks a soil sample against a color chart to help him classify the soil.

predetermined curves and graphs to get the site index. For example, a loblolly pine that is 35 years old and 75 feet high indicates a site index of 88.

The site index team may sample a dozen sites on the same kind of soil at different locations. In most cases, all samples will show about the same site index.

Eventually, all or most of the woodland soils in Arkansas will be site indexed. Then—using soil maps provided by the Soil Conservation Service—farmers, ranchers, woodland owners, woodland industries, national forests, and State forests can determine the site index for their respective woodlands.

This knowledge will help determine the type of woodland management to apply, the kinds of trees that are practical to plant and manage, and the amount of pulp or sawlog production to expect.

Team effort is helping make this useful information available faster. ♦

Improved Woodland Pastures Restore Tree-Grass Balance

By Robert J. Olson
Woodland Conservationist, SCS, Spokane, Wash.

SEVERAL eastern Washington farmers, owners of stagnated "bull" pine stands too thick to grow any grass or much timber, are showing how both can be produced profitably.

They are thinning out excess trees with bulldozers so the remaining trees can grow timber at a faster rate. An improved pasture of adapted grasses is then seeded under the well spaced trees.

For Herb Armstrong of Harrington, a cooperator with the Sprague-Harrington Soil Conservation District, this method is past the trial stage. He has already thinned more than a hundred acres of ponderosa pine on his farm north of Davenport near Porcupine Bay on the lower Spokane River. He is expanding his operations so he can do more each year.

Bulldozer used

Armstrong uses a bulldozer to take out the unwanted trees. He backs into the stand, then lifts out or tips over the smaller, weaker, and poorly formed trees in such a way that they can be pushed out of the stand, crown first, without damaging the ones left to grow.

After the broken limbs, tops, and roots are cleaned up, a heavy disking puts ground in shape for seeding. The usual tame pasture grasses adapted to the climate and soils are used. With a spacing of 16 feet or more between trees, grass can be seeded with an ordinary grass drill. An area cleared during the winter may be planted in the spring, or it may be summer-fallowed for a year before seeding. Application of 20 to 30 pounds of nitrogen an acre gives the grass a good boost the first year.

Thinning ponderosa pine stands this way is a money-making proposition. The best, most productive

trees are left. They grow faster and reach a commercial size quicker than they would in a dense thicket. The soil, sunlight, and moisture formerly used by the trees that were dozed out can now contribute to growing grass. The grass used as pasture gives an immediate return from the land; the remaining trees make a good long-term investment.

Opening pine stand

Opening up a pine stand and seeding it to grass works best in the area of scattered timberlands between the prairies or natural grasslands and the dense, more moist timberlands. Soils here are sandy or gravelly and light enough to stand dozing and grazing.

Here trees and grass grow together naturally. Past misuse of the land has reduced the grass to low condition and caused dense thickets to develop. Such areas produce little forage, and the dense pine grows slowly.

Removing all the trees often dries out the soil so that few grasses will grow. Where the pines are only thinned, however, the trees grow faster, and the grass grows better.

Eastern Washington has a lot of this kind of woodland. Many old timers remember when these same areas were open park-like stands of big trees and lush forage. There are different ideas as to how past misuse has caused areas to "dog hair" back. Some think it is because the grass and forest fires have been controlled. Others say it is because of overgrazing and bad logging practices.

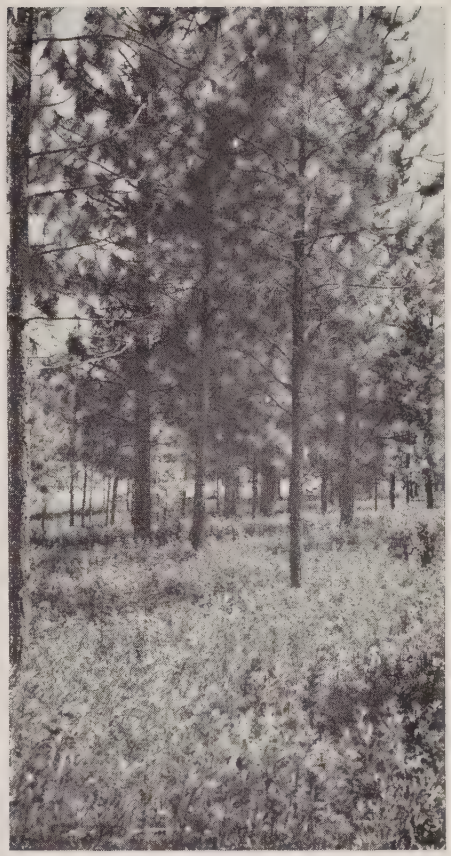
There are other reasons, too, why landowners are thinning their woodlands. Reducing the fire hazard is especially important near centers of heavy population. Fire danger is minimized because there is little chance of ground fire crowning through the widely opened trees.

Cattle are kept from "holing up" in thickets, and riding is easier.

Where thinned areas are to be used for recreation or beautification, low-growing grasses can be seeded instead of pasture grasses. Plants preferred as food by elk and deer can be used if it is desired to improve hunting.

One of the main reasons that many woodland owners do a good job of developing pasture in their woodlands is the pride of ownership.

Whatever the reason, Armstrong and farmers like him are changing pine woodlands back to the way nature had them before the white man came. They have found that copying rather than fighting nature is the most profitable way to handle their woodlands. ♦



A 2-year old grass-legume mixture in a stand of ponderosa pine thinned with a bulldozer.

A dense stand of pine thinned in the conventional manner with a chain saw (left) could not be seeded with a drill because of the stumps. A similar stand thinned with a bulldozer (right) is ready for seedbed preparation.

Conservation Helps Make Religious Camp "Home in Woods"

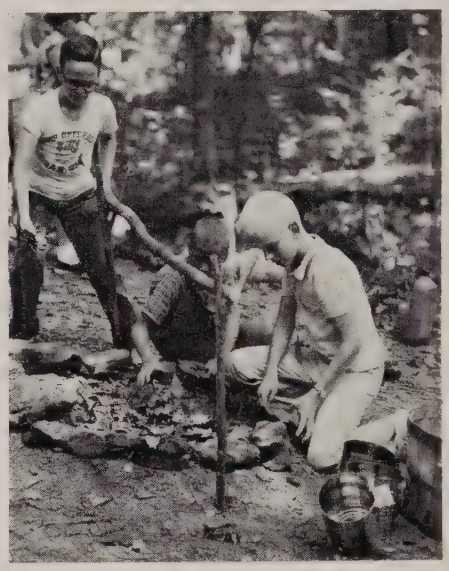
A SOIL AND WATER conservation plan has made 338 acres of rolling countryside into a "home in the woods" for more than 500 boys and girls in Hocking County, near Logan, Ohio.

Camp Otterbein's lodge and 14 cabins are nestled in some 30,000 pines overlooking a green and well-kept valley. The camp, which belongs to the Ohio Southeast Conference Evangelical United Brethern Church, was purchased in 1958. The church board asked Dr. L. B. Sharp, then of the Outdoor Association of New York City, and later the executive director of the Outdoor Education Association at Southern Illinois University, to assist in developing a master camp plan.

With Dr. Sharp's encouragement, the church board applied to the Hocking Soil and Water Conservation District for help in developing the entire 338 acres. Through the district, the Soil Conservation Service provided technical aid in tree planting, woodland improvement, wildlife food and cover areas, seedings for recreation and picnic areas, and the construction of several lakes.

Activities at Camp Otterbein begin each morning with a flag pole ceremony, followed by morning watch devotions, breakfast, and singing. Afterwards, each group selects a new "home in the woods" where they will spend the day. Here they build a fireplace for cooking meals, and also a simple place of worship. The day is passed in bible study, hiking, nature study, and games.

Last summer, some 560 young people enjoyed a summer at the camp, and at least as many are expected this year. All of them will enjoy the green and well-planned beauty that soil and water conservation measures have brought to the area.—WALLACE A. GILLOGLY, *Work Unit Conservationist, SCS, Logan, Ohio.* ♦



Below, happy campers return to the lodge from their day in the woods. The camp has 30,000 pine trees. Right, what's better than home cooking, when the home is a woods? Boys prepare an impromptu fireplace while, offstage, the girls start dinner.

Soils Information Adds Value to Continuous Forest Inventory

By Jacques J. Pinkard
Woodland Conservationist, SCS, East Lansing, Mich.

THE ADDITION of soils information to the data being collected by the Ford Forestry Center's continuous forest inventory at L'Anse, Mich., yields information of value to woodland managers over a wide area.

"This work provides the first reliable data on the range of productivity and on mean productivity, of all the soils classified on the plots," says Dr. Eric Bourdo, director of the center.

The Soil Conservation Service is classifying and describing the soils on each of the inventory plots in response to a request from Dr. Bourdo to the Baraga Soil Conservation District for assistance in relating the continuous forest inventory (CFI) to soil characteristics.

Dr. Bourdo's ultimate goal is to find the relationship between soil classification and timber stands at the Ford Forestry Center as well as on some 7,000 to 9,000 established check plots within the immediate vicinity.

Continuous forest inventory is a tool in forest management often used by wood products industries. In establishing a CFI system, sample plots are permanently located throughout the woodland property, and periodic measurements are taken and recorded in accordance with statistical standards. Plots usually are one-tenth to one-fourth acre in size. Trees on the plots are treated and managed the same as those in surrounding areas.

Measurement data usually consist of recording species present, diameters, heights, vigor, form class, quality, merchantable height, mortality, and others, plus general characteristics of each plot. From these data, forest managers can analyze and compute wood volume, quality, species composition, and periodic growth.

The CFI system is an outgrowth of the European method of inventory control. Several changes have been made to adapt it to American forestry. One is the use of sample plots instead of tallying an entire extensive woodland. Another is the use of electronic computers to compile and analyze data.

The computer procedure, once devised, can be used repeatedly for all reinventories. Once in operation, this is an economical way of providing woodland owners with fairly accurate information on the amount and kinds of wood products they own and what might be expected in future growth.

To obtain the soils data needed to achieve Dr. Bourdo's objectives, soil scientists and foresters locate the CFI plots on general soil maps prior to classifying them. They dig a pit to a depth necessary to properly classify the soil. The soil scientist examines each layer of soil for such properties as thickness, color, texture, structure, consistence, reaction, and boundary between layers. He then notes slope, aspect, erosion, root distribution, stoniness, and ground water. The soils are then named and correlated in the national soil classification system.

There have been only a few attempts to correlate timber stand or timber quality with the various kinds of soil as a part of the continuous forest inventory.

The special interest of the Ford Forestry Center in this correlation is understandable. The center is located in Michigan's Upper Peninsula, which is 90 percent forested. It is dedicated to the future of Michigan's forests and to the economic well-being of the Upper Peninsula. The center was created in 1954 when the Ford Motor Company donated to the Michigan College of Mining and Technology, now Michigan Technological University, the community of Alberta with its excellent sawmill and 1,703 acres of adjacent forest.

Dr. Bourdo will prepare an annual summary of progress from data he receives from the SCS. He will then call in a committee of soil scientists and foresters representing the Michigan Department of Conservation, the Cooperative Extension Service, the Michigan Agricultural Experiment Station, the U. S. Forest Service Regional Office, the Lake States Forest Experiment Station, the Soil Conservation Service, and other agency and industry leaders who are interested in the work.

This committee will review progress yearly to determine whether the work is to be continued. Future inputs of soil survey and other information will depend on these evaluations.

Present CFI systems in Michigan had their beginning in 1937. Nationwide, data resulting from CFI are being used in the management of more than 85 million acres, 57 million acres of which is federally or State owned. Twenty-six million acres are operated by 100 companies, 24 of which are in the 9-State area of the Lake and Central States.

In Delta County, Mich., CFI plots are to be classified in 1966-67. This is a logical place for CFI correlation studies because a progressive soil survey is being made there at this time. Soils to be classified first are those that occupy a considerable acreage and are important to the forest economy.

It is hoped that these studies on relationships of tree growth to soils and sites can be worked out on a representative sampling of CFI plots in central and northern Michigan and adjoining States. ♦

Principles of Planning a Woodland

By C. T. Prout, Jr.
Head Woodland Conservationist, SCS

PLANNING a woodland for sustained performance as part of a balanced farm or ranch operation, as a commercial wood crop enterprise, or as a recreational retreat, is a complex procedure.

A workable plan must match the physical resources of the tract to the economic and personal circumstances and desires of the owner or operator.

Sometimes, a man must stand alone. Although no one is ever entirely self-sufficient, the land owner or operator alone can make the decision to use his land for a specific purpose. He must weigh the facts provided and the counsel given by service agencies and advisers; he alone can commit himself to the course that best leads to his conservation and production objectives.

The woods owner must see the need and desire the results of conservation before he will plan seriously for the long term. This may be a deep-seated and long-lived thing. Or it may have started when he attended a demonstration of forestry practices sponsored by the Extension Service and his conservation district (below).

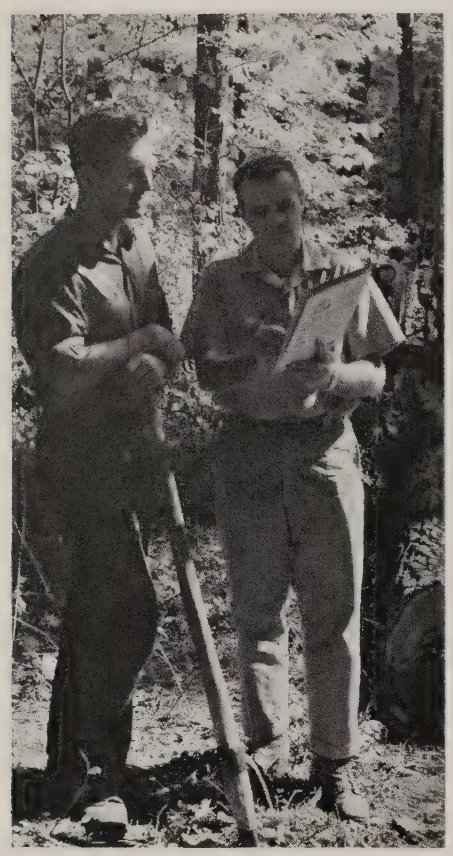
His woodland may be in a tract by itself, or it may be part of a farming or ranching unit (above). His holdings may be divided between forest, pasture, cropland, and other uses. In any event, he needs to take stock of the resources that are his.

These resources are related to the kinds of soil he has (right). He needs to know the capabilities of each soil for various uses and its potentials for growing trees and other types of vegetation. He needs to know the alternative uses to which his land can be put. This information can be supplied through the local conservation district by the SCS conservationist.

He must choose from the feasible alternatives and define his objectives.

He may decide to convert open cropland or pasture to woodland, or to change some of the land now growing trees to other uses. He may or may not wish primarily to grow wood products for the market. He may place a higher value on the enjoyment of his woods through hunting (left) or simply making the forest more attractive and accessible as a place of naural beauty.

In making this choice he needs also to know something of his own capabilities—whether he will be able to do the work in the woods himself and whether he has the financial resources to invest in long-term woodland development.



He reaches the decision point once he has taken stock of the resources of his tract and considered the alternatives that are within his reach.

Then the woodland owner or operator must decide the kinds or practices and the amounts of each to be applied. If he wishes to develop a practical conservation program, he must know the adaptabilities of different kinds of trees to the kinds of soil he has. He must know what these trees are, what they look like, and what he needs to do to protect them and make them grow.

If he plans to use his land for the production of a wood crop, he needs to know the kinds of practices that will give optimum production. Again, he must make the decisions.

These decisions, systematically recorded, make up his conservation plan. The soil conservationist, available through his local conservation district, can help him consider the alternatives and record his plan.

For more intensive forest management, he may desire the services of a professional forester. He may request assistance from the State forest agency, or he may engage a consulting forester on a fee basis.

The forester can go into detail in helping him plan his forest management (left). He can determine the volume of standing timber, how fast the trees are growing now, and their probable rate of growth in the future.

He can help him determine how much timber could be harvested, and how and when, to get a periodic income. He can give help and advice in locating markets for the timber that is for sale.

The best of plans are to no avail unless they are carried out. Some owners may want to do all the work themselves. They will need to know about the tools needed and how to use them.

Others may prefer to lease the tools or to hire the work done. They may be able to get help through their local conservation district.

In many districts, such equipment as tree planting machines, pruning saws, planting bars, hardwood control devices, and the like are available for the use of district cooperators. In others, contractors make a business of woods work.

The final payoff of a woodland enterprise is the sale of the wood product. A knowledge of markets, prices, quality, and the like is necessary for the owner to wisely market his product.

The professional foresters of public agencies or of industries and consulting foresters are available to render this kind of service.

Cooperation? Yes, the landowner becomes a cooperator with his local soil and water conservation district. The Soil Conservation Service helps him make a complete conservation plan for his entire property, including the woodland as one of the land uses. Other agencies, industry, and private foresters cooperate with the district to provide the services that will help the individual carry out sound conservation and woodland management to satisfy his needs today and in the future. ♦

The precast concrete structure with automatic gate in open position, above, and closed, below. The timing device is above the metal gate.

Automatic Basin System Reduces Irrigation Water and Labor Needs

By Leon Kimberlin
Conservation Agronomist, SCS, Phoenix, Ariz.

AN AUTOMATIC basin irrigation system enables J. T. "Ted" Gilcrease of Clark County, Nev., to irrigate 215 acres of alfalfa with only 1 hour of labor each day.

In addition, he gets more efficient use of his irrigation water and has stopped the wastage of tailwater into the desert.

Gilcrease, a dedicated conservationist and supervisor of Vegas Valley Soil Conservation District, has worked out a system of recessed field ditches and clock-operated check gates to fully automate his irrigation job.

"I started working with 10 acres of basin irrigation in 1946," says Gilcrease, "because I was tired of seeing tailwater run into the desert at the ends of my fields. The savings in water and increased hay yields looked good to me."

Gilcrease liked everything about his new system except getting up at night to change the irrigation water. He looked for ways to reduce labor without sacrificing irrigation efficiencies.

By 1959 he had worked out the details to automate the system. This called for leveling land across the slope in dead-level basins. He constructed field ditches so the tops were level with the field surface.

The ditches run through the center of each basin and stair step downhill with a check-gate at each step between basins. Check structures are made of precast concrete with swinging metal gates which, when closed, raise the water level in the ditch to flood the basin just upstream from the check-gate.

Gates are latched in the open position at the beginning of irrigation. Timers are set to allow gates to close and change the flow of water from one basin to the next. Irrigation begins at the lower end of the field and pro-

J. T. Gilcrease (right) and SCS Conservationist Richard Capurro are on the border between two basins where water "stair steps" down through an automatic gate. When the gate is closed, the water backs up in the ditch behind the men and floods the basin on either side.

gresses up the ditch as the gates close in timed succession.

Timers are interchangeable and can be moved from one gate to another. Gilcrease has enough timers to automate 12 hours of irrigation at one time. It takes him 30 minutes to set up for a full 12 hours of irrigation.

The size of basins is dependent upon the intake rate of the soil and the size of the irrigation stream delivered by the ditch. Although Gilcrease uses small basins (1.7 acres in each), most field operations are performed across the basins with one-half mile between turns for large-sized equipment.

He keeps the difference in elevation between basins to 1 foot or less, for ease in handling equipment. But he explains that a difference in elevation of at least 6 inches is necessary for the system to work properly.

87 percent efficiency

On his basin-irrigated fields, Gilcrease produces a crop of alfalfa with only 72 acre-inches of water, at an overall irrigation efficiency of 87 percent. This means that only 13 percent of the water entering the system escapes by seepage, deep percolation, or is otherwise lost to crop use—an exceptionally low figure.

"I've increased irrigation efficiency by 20 percent while reducing labor requirements more than 80 percent," Gilcrease says.

So far, he has converted 215 acres from graded slope to automatic basin irrigation. He plans to convert about 35 acres each year until his entire 480 acres of irrigated land has been automated. He builds his own check structures and does his own leveling.

At current contracting and materials prices, Gilcrease estimates it costs $80 to $100 an acre to change to the new system. These costs are rapidly recovered through savings in water, reduced labor, and increased hay yields. ♦

SCS Plots Test Plants to Find Better Duck Foods

By Clifford C. Sorensen and Harry A. George
Plant Materials Specialist, SCS, and Game Manager, California Department of Fish and Game, Pleasanton, Calif.

LAND OWNERS and wildlife biologists seeking ways to improve winter habitat for waterfowl in California have stimulated a program of testing food plants at the SCS Plant Materials Center at Pleasanton.

Millions of waterfowl migrate along the Pacific flyway each year and make California their primary wintering ground.

As agriculture, industry, and urbanization reduce the waterfowl habitat, causing the birds to turn to agricultural crops for much of their food, landowners have become interested in improving the remaining marshland and converting marginal land into good waterfowl habitat.

SCS conservationists and game department biologists were asking, "What and how should we plant on these areas?"

A three-way agreement between the California Department of Fish and Game, California Division of Soil Conservation, and the Soil Conservation Service in 1958 initiated a systematic testing program for improving grasses and legumes for waterfowl food.

Formal testing of waterfowl food plants began in the spring of 1959. Species were grouped according to agronomic characteris-

Workmen harvest promising waterfowl food plants at testing center. Because of small size of plots, all work had to be done by hand.

General view of waterfowl food plants in initial tests at the Pleasanton Plant Materials Center.

ties, water requirements, and growth habit.

Ponds were constructed so the amount, depth, and frequency of irrigation could be controlled to simulate marsh or shallow water conditions.

Species selected were seeded in 20-foot rows, 30 inches apart. This allowed easy access for observations and weed control. Because of number of species involved and length of rows, all work in the ponds was done by hand.

Plant performance was observed and compared throughout the growing season. At the end of each season, each row was harvested. The material was placed in cotton bags and dried, and forage and seed yields were determined.

This system made it possible to test and evaluate a large number of plants in a short time. Since 1959, more than 500 accessions, representing 12 use groups of waterfowl food plants, have been tested. Other use groups will be brought into the testing program at a later date.

Second step in the systematic testing process consisted of seeding selected species in ¼-acre plots at the Gray Lodge Field Evaluation Planting near Gridley, Calif. Work at this site is carried out by the California Department of Fish and Game. Technical and onsite assistance is provided by the Pleasanton Plant Materials Center.

To obtain enough seed for plots of the Gray Lodge evaluation plantings, superior species were selected from the initial testing and put into small-scale increase plantings. The best methods of harvesting, threshing, and cleaning each kind of seed were also determined.

To date, selected strains of watergrass, bulrush, smartweeds, millets, perennial grasses, and vetch have been tested at Gray Lodge. Three or four new accessions probably will be seeded each year. Each plot will be maintained for 5 years, during which plants will be comparatively evaluated on aspects important to waterfowl.

Plants that continue to show superiority will be placed in field size plantings on cooperators' farms in soil conservation districts, State and Federal refuges, and on duck club land.

During these final tests under actual use conditions, specific soil and climatic adaptation as well as actual usage by waterfowl will be determined. Superior plants from these final tests will be certified and released for commercial production. ♦

Mallard ducks rising from a field of watergrass at the Gray Lodge Waterfowl Management Area near Gridley, Calif.

Water Control for Better Pasture

Land leveling on the Green Brothers farm to aid uniform water distribution.

IMPROVED water management has meant better pasture and easier farming to Calvin and Cecil Green.

Calvin and Cecil own and operate a 923-acre livestock farm northwest of Rigby, Idaho. They purchased an additional 240 acres that was cut up with ditches, making fields odd shaped and uneven—and difficult to farm. A high water table further limited farming operations and made proper irrigation of crops impossible.

Most of the land was in native grass and weeds which provided little grazing for their beef cattle.

With SCS technical help through the Jefferson Soil and Water Conservation District, the Green brothers developed a complete conservation plan for the farm. Under the plan they did land leveling on 160 acres and installed 9,240 feet of new irrigation ditches; 1,400 feet of open field drains; and 200 feet of buried drainpipe. An existing drain serving several farms was cleaned and enlarged.

Most of the land will be seeded to improved permanent pasture and will furnish supplemental feed for the livestock.

With these improvements completed, the farm now will furnish better forage with a minimum of labor.—ALBERT NEU, *Soil Conservationist, SCS, Challis, Idaho.* ♦

Windbreaks

(Continued from p 31.)

stock drifted for many miles in the range country. Many suffocated in sheds and corrals, and in some cases shed roofs collapsed from the weight of snowdrifts.

Fortunately the loss of human lives was relatively small from the blizzard. Temperatures were not cold—as blizzards go—hovering between 5 and 10 degrees above zero.

Some lessons learned

Plains farmers and ranchers are a hardy lot, but they can take advantage of the lessons learned from the big blizzard of '66. In many cases present windbreaks can be improved by planting additional evergreen and shrub rows.

Farmsteads with windbreaks on only one side can be made more livable with additions to provide protection from other directions. The average Northern Plains farmstead or ranch area needs winter protection from the west, north, and east.

Competent conservationists and foresters are available in most counties to help landowners assess the effectiveness of their windbreak layout and to suggest improvements where needed. Most soil conservation districts have trained tree planting crews and the facilities they need to help make the Plains a better place in which to live.

Killer blizzards as severe, and with as much snowfall, as the 1966 blizzard occur only about once every 20 years or so on the Plains. But when they come, people should be prepared.

Tree windbreaks will help to weather these recurring catastrophies. Many more of them are needed. ♦

Pond Fees Dedicated to Farmer's Church

A farmer-cooperator dairyman in the Marion County Soil Conservation District, Miss., pledged to his church the fishing proceeds from 1 of 13 ponds on his 300-acre farm. In 5 years they amounted to $2,000.

The Olah Methodist Church near Columbia had gone heavily into debt to pay off building costs. Steward Lewis Wesley decided to help by contributing the fishing fees from a 2-acre lake and part of the profit from fish fries held when he drains the pond.

Wesley, who got SCS assistance in designing his pond, followed prescribed practices of stocking, fertilizing, and deepening of edges. The pond Wesley dedicated to the church also furnishes water for livestock and garden irrigation. ♦

Population in Appalachia

Although Appalachia's total rural population descreased only slightly in 1950-59, its farm population declined 57 percent in the Appalachian region, compared to 43 percent in the surrounding area and in the United States. ♦

Three New RC&D Projects Plan for Economic Growth

A WIDE RANGE of project measures aimed at improving employment and business opportunities through local initiative and investment are planned in three new Resource Conservation and Development projects recently authorized by Secretary of Agriculture Orville L. Freeman for Federal assistance in carrying out the proposals.

Following are resumés of the project plans, prepared with the cooperation of State and Federal agencies under the leadership of the Soil Conservation Service:

Bitter Root Valley, Mont.

The Bitter Root Valley Resource Conservation and Development Project in western Montana covers 1,800,760 acres in Ravalli and Missoula counties, of which about 1,221,000 acres is federally owned. The project area, primarily agricultural, has a population of about 15,000. Cattle is the chief source of income on most farms. Hay and pasture are the main crops.

The area is rich in history, having been traveled by the Lewis and Clark expedition and was the scene of Indian wars.

The project is sponsored by the Bitter Root Soil and Water Conservation District, the county commissioners of Ravalli and Missoula counties, and the Missoula Soil and Water Conservation District.

The sponsors estimate that planned project measures will create more than 6,300 man-years of employment during the next 20 years, with an equal number of man-years of employment created in commercial and service industries in the area.

Sponsors plan at once to complete rehabilitation of 10 high mountain storage dams and reservoirs; support and encourage full development of public and private recreation facilities in the project area; stimulate opportunities for commercial use of woodland products by small woodland owners; accelerate conservation planning assistance; install gravity flow sprinkler irrigation systems in the Bitter Root Valley Irrigation District; initiate action on a water needs study of future requirements for municipal, agricultural, industrial, fish and wildlife, and recreational uses.

Long-term actions are expected to complete the Burnt Fork Dam project; assist local people in developing recreation facilities; coordinate rangeland planning for range improvement on about 139,000 acres of privately owned land; develop or improve water storage on 25 multiple purpose projects; develop 75 miles of access roads to recreation areas; provide a means to inventory, restore, and preserve historical sites and areas; develop job opportunities for supplemental income for uneconomic farm units; improve private forest woodlands; and strive for better use of all forest resources.

Arkansas River Valley, Ark.

The Arkansas River Valley Resource Conservation and Development Project covers about 3.7 million acres in Crawford, Franklin, Johnson, Logan, Pope, Scott, Sebastian, and Yell counties in west-central Arkansas. About 44 percent of the area is in woodland, including 1,238,000 acres of national forests. The 8 counties have a population of about 167,000.

The project sponsors anticipate that net income in the area will increase $6 million annually over a 10-year period. They expect long-term industrial growth to provide 10,000 new jobs and tourism to open 5,000 new job opportunities as the local economy expands under impetus from the intensified resource conservation and development program.

Under the plan, an accelerated watershed improvement program is proposed for flood protection to 200,000 acres of bottom land; conservation protection to 2.5 million acres; multiple use municipal and industrial water systems for 30 towns and cities; improved agricultural production; and expanded public and private recreation facilities.

Acceleration of multiple purpose recreation improvements in the Ouachita and Ozark National Forests to help meet outdoor recreational demands also are proposed in the plan, as well as wildlife and other developments.

The project sponsors expect work to begin in the near future on such measures as the Mount Magazine Girl Scout Council permanent camp; Jones Creek Recreation Lake in the Poteau River watershed; Little Clear Creek watershed multiple purpose dam at Alma; planning of the Flat Rock Creek watershed near Van Buren and the Cedar Creek watershed multiple purpose dam for town water at Havana, Danville, and Belleville; strip-mine reclamation for a golf course and recreation area at Russellville; Mays Branch irrigation, storage, and flood detention dam in Crawford County; and accelerated conservation planning and land treatment in the project area.

St. John-Aroostook, Maine

The St. John-Aroostook Resource Conservation and Development Project in Maine includes 2.7 million acres in 107 townships in southern and northeastern Aroostook County and 4 townships in Penobscot County. More than 2.1 million acres of the area is timberland. Also included are the intensively farmed potato lands of Aroostook County.

The work plan was developed by the local project sponsors with assistance of 17 Federal, 18 State, and 14 local agencies. Local sponsors are the Central Aroostook, Southern Aroostook, and St. John Valley soil and water conservation districts, Aroostook and Penobscot County commissioners, and 65 towns.

Sponsors estimate that over the next 20 years, application of project measures will result in 3,000 additional man-years of employment. They expect the project to result in economic improvement through increased agricultural income, diversified industry that will increase job opportunities, and better use of natural resources.

Some of the project measures are already under way, many will be started immediately, and others —many of which will deal with industrial and recreational expansion—will be added as the project progresses.

Forty-nine project measures are proposed in the plan. They include additional soil surveys, land and resource plans for individual towns, accelerated land treatment, sediment-control projects, small watershed projects, development of sugar beet industry, fish and wildlife development, flood prevention and municipal water supply for Westfield and Washburn, recreation developments, treatment and improved management of woodlands, water supply and distribution system for Eagle Lake, and better sewage disposal facilities for communities.

A few of the numerous measures the sponsors expect to be started in the near future include acceleration of conservation planning, land treatment and forestry measures, erosion control at the Van Buren hospital site, development of town land and water resource plans, erosion and water control at Presque Isle and Mars Hill, and construction of Caribou Golf Course. ♦

National Study of Strip-Mined Areas

The Federal Government under the 1965 Appalachian Regional Development Act has launched a nationwide study of strip and surface mining.

Before the Act, attention to this problem was concentrated primarily in the Appalachian States, especially to mining of coal and of sand and gravel.

The new study involves the gathering of physical data on surface-mined areas throughout the 50 States, the making of observations on surface areas disturbed to recover 56 different kinds of minerals, and the inclusion of all areas mined regardless of date.

Under the leadership of the Bureau of Mines, the Tennessee Valley Authority, Bureau of Land Management, Forest Service, Soil Conservation Service, and the cooperating States, experienced field personnel most intimately associated with the areas where mining has taken place will make onsite appraisal of the physical conditions of these areas. Because of the volume of the data collected, these teams plan to use electronic methods to analyze the data.

The purpose of the study is to present recommendations to the President, and he in turn to the Congress, for a long-range comprehensive program for reclamation of such areas.

USDA plans to use these data also to assist soil conservation districts in the development of their short- and long-term conservation programs and in updating the Conservation Needs Inventory. ♦

Forest Cutting

During the past 150 years the forest lands in most of the southern Appalachian, Allegheny, White, and Green Mountains in the Eastern United States have been cut over one, two, or more times. ♦

Plowing Match to Show New Practices

A FEATURE of the conservation demonstrations at "Agrirama, U.S.A.," the 1966 National Plowing Matches and Soil Conservation Field Days, will be terraces with tile outlets and seeded back slopes which can take the place of grass waterways.

Also of interest will be a model farm pond with its wildlife refuge, planned jointly by the Iowa Conservation Commission, Iowa Extension Service, and the Soil Conservation Service. There will also be a pasture renovation project and contouring and tiling demonstrations.

Between 100,000 to 150,000 midwesterners are expected to attend the event in Jefferson, Iowa, September 8 to 9.

Agronomy demonstrations include 20-, 30-, and 40-inch corn row comparisons in which 18 seed corn companies are participating; similar demonstrations with soybeans, grain, and forage sorghums; comparisons of rates of application of herbicides and insecticides; corn yield tests with a goal of 250 bushels an acre.

Educational tours will be held for mostly seventh and eighth graders, who come from far and near in their school buses. ♦

Farm Ponds Solve Water Problem

Farm ponds now solve the water shortage problem of a Negro farmer in the Sherman Hill Community in Mississippi. Esau Carter, a cooperator with the Scott County Soil Conservation District, built three ponds with ACP funds and SCS technical help through the district.

"Before the ponds were dug," says Carter, "I had to drive cattle 3 miles every day to get water during the dry season. This took 3 or 4 hours daily. We hauled water to the hogs."

CONSERVATION PROFILE

R. Sloan Rainwater

Arkansas

Love of land culminates in watershed project

A TRADITIONAL love of the land, handed down from generation to generation to R. Sloan Rainwater, is being gratified as the Flat Creek Small Watershed Project in Arkansas nears completion.

Mr. Rainwater lives in the same valley where his great grandfather settled long ago on the bank of the creek.

Sloan Rainwater is chairman of the Lawrence County Soil and Water Conservation District board of supervisors and has worked long and diligently to organize the watershed project and see it to completion.

Sloan Rainwater was born 3 miles southwest of Imboden on a poor 80-acre hill farm. The third child in a large family, he worked hard to finish Imboden Public School in 1909 and later graduated from Sloan Hendrix Academy and then from the University of Arkansas in 1916. He came out of World War I a pharmacist's mate, attended Little Rock Pharmacy School, and eventually owned and operated three drug stores. He also was county superintendent of schools for 15 years and has served as president of three banks at various times.

While a young man, he began buying small tracts of land and now owns some of the most productive cotton, rice, and soybean land in Lawrence County.

"The first $1,000 I ever saved for investment was made from the sale of cotton and timber from my land," he says.

His first cotton gin was built in 1926. He has operated continuously in that business since, in as many as 3 States and 10 counties. In 1962 his company handled more than $3 million worth of soybeans and cotton.

Mr. Rainwater is active in the Methodist Church and Masonic Lodge; has served on the boards of colleges and other county and State institutions.

Because of his love of the land, in 1938 he helped organize the Tri-River Soil Conservation District, comprising three watersheds in three counties. When the Lawrence County District was created, he was elected the first chairman of its board of supervisors and has served in that capacity ever since.

He served as president of the Arkansas Association of Soil and Water Conservation Districts from 1948 to 1955. He wrote its constitution and bylaws and was responsible for setting up its organizational structure dividing the State into seven areas.

Rainwater was Arkansas' representative on the Council of the National Association of Soil and Water Conservation Districts from 1949 to 1956 and assisted in writing its organizational pattern and handbook. He was vice president of the Gulf area 1955-60; member of the board of directors 2 years; and chairman of the National Committee for Conservation Field Days and Plowing Matches for 6 years.

Mr. Rainwater gives credit for much of his success to his wife, the former Virginia Hatcher. They have two sons, one a lawyer and professor at Little Rock University and the other a civil engineer, and two grandchildren.

The Rainwaters spend their happiest hours in their new summer home on the bank of beautiful Spring River from which they can see their herd of purebred Angus cattle grazing.—A. J. TROXELL, *Executive Director, Arkansas Soil and Water Conservation Commission, Little Rock, Ark.* ♦

Watershed Story at Flower Show

Five northeastern Illinois soil and water conservation districts presented an exhibit on watershed conservation to the Chicagoland Flower Show last March.

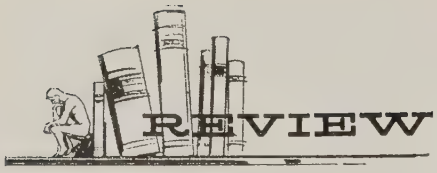
Four hundred thousand persons viewed the 6-foot-long styrofoam relief model of the local Salt Creek watershed in the 10 days it was displayed.

The show's sponsors rewarded the multidistrict effort with an Award of Merit.

In addition to the sculptured and painted model of a real suburban watershed, there were printed cards, drawings, and maps pointing out the benefits of a watershed protection and flood prevention project.

Cost of the $1,700 display was shared by McHenry, Lake, Kane-Dupage, North Cook, and Will districts.

John Quay, landscape architect and vice chairman of the Lake County Regional Planning Commission, designed the exhibit. Show officials gave the districts free display space. ♦



Silvics of Forest Trees of the United States. EDITED BY H. A. FOWELLS. *1965. USDA Agr. Hbk. 271. 762 pp., illus.; paper. $4.25.*

In "Silvics of Forest Trees of the United States," the reader can draw on the work of a decade of Forest Service activities in the field of dendrology and silviculture for essential information about the more important species of forest trees in this country.

In 1955, under the leadership of F. H. Eyre, then director of the Division of Timber Management Research, the Forest Service began to document information for tree species throughout the United States. The various forest experiment stations published 127 reports as station releases. Ten years later, with some rewriting and modifications, this compendium of 125 species was published.

For each species there is a brief description of the tree and its habitat, followed by a section on habitat conditions in which the climate, soils, and topography are described, and associated trees and shrubs usually found growing with the species are listed.

In a section on life history, the reproduction and early growth of the species, growth of the tree from sapling stage to maturity, reaction to competition, and principal enemies, including insects, diseases, and other pests, are described.

Since there are few tree species in the United States without some racial variations, there is a section on races and hybrids.

A list of references for each species is provided.

This work will be valuable to practicing foresters and technicians interested in the silvical characteristics of trees and to laymen with an interest in the subject, as well as to research organizations, universities, and colleges. It will be a welcome addition to any library on natural vegetation. —CARROW T. PROUT, JR., *Head Woodland Conservationist, SCS.*

New Publications

Water Quality of the Potomac River Estuary at Washington, D. C. BY W. H. DURUM AND W. B. LANGBEIN. *1966. U. S. Geol. Surv. Circ. 529-A. 9 pp., charts and map.* A summary description of water conditions at and below the Nation's capital, a major concern of the President's plan for the Potomac. "Nearly 3 million tons of sediment is discharged annually by the Potomac River. Areas in the Washington metropolitan area undergoing urbanization have rates of sediment yield that are 50 times greater than rates in rural areas."

Total Porosity and Random Roughness of the Interrow Zone as Influenced by Tillage. BY R. R. ALLMARAS, R. E. BURWELL, W. E. LARSON, AND R. F. HOLT. *1966. USDA Conserv. Res. Rpt. 7. 22 pp., illus.* Estimations made and tested of total porosity and random roughness for areas between 40-inch corn rows (the interrow) in tillage experiments on Barnes-Aastad, Nicollet-Webster, and Kranzburg-Poinsett soil associations in western Minnesota and eastern South Dakota.

Eleven Authorized Flood Prevention Watersheds. 1966. *USDA Soil Conservation Service SCS-CI-15.* Purpose, progress, area, cost, and completion dates given for the 11 watersheds authorized by the Flood Control Act of 1944 for watershed investigations and for planning and installing measures to reduce runoff and erosion and slow down streamflow. These watersheds cover 30 million acres.

Stream Quality in Appalachia as Related to Coal-Mine Drainage. 1965. BY J. E. BIESECKER AND J. R. GEORGE. *1966. U. S. Geol. Surv. Circ. 526. 27 pp., illus.; map in pocket.* Basic data of field determinations and laboratory analyses and summary of field reconnaissance that disclosed that 194 of 318 sampling sites were measurably influenced by mine drainage.

Restoration and Retention of Coastal Dunes with Fences and Vegetation. BY J. A. JAGSCHITZ AND R. S. BELL. *1966. Rhode Island Agr. Expt. Sta. Bul. 382. Kingston, R. I. 43 pp., illus.*

Federal Executive Policy Governing the Reporting of Recreation Use of Federal Recreation Areas. BY RECREATION ADVISORY COUNCIL. *1965. Circ. 6. 5 pp. $0.10.*

When Natural Disaster Strikes. *Revised 1966. USDA PA-533. 8-page foldout.* What the U.S. Department of Agriculture can do.

Guides to Outdoor Recreation Areas and Facilities. BY U.S. BUREAU OF OUTDOOR RECREATION. *1966. U.S. Department of Interior. 36 pp. 20¢.* A listing of lists.

American Beachgrass (Establishment, Fertilization, Seeding). BY J. A. JAGSCHITZ AND R. S. BELL. *Rhode Island Agr. Expt. Sta. Bul. 383. Kingston, R. I. 43 pp., illus.*

Surplus Cropland. *USDA PA-670. (12 pp., illus.).* The ACP story of "opportunity for increasing benefits through conservation action."

Soil Surveys

Dyer County, Tennessee. BY WILLIAM C. MOFFITT, CHARLES L. MOORE, AND WESLEY C. JACKSON. *1965. 79 pp., illus.; maps 4 inches to the mile (1:15,840).*

Reno County, Kans. BY JAMES J. ROCKERS, IVAN RATCLIFF, LOUIE W. DOWD, AND EDWARD F. BOUSE. *1966. 72 pp., illus.; maps 317 inches to the mile (1:20,000).*

Alfalfa Increases Intake Rates

A 6-year study of the effect of crop sequence and tillage practice on water intake rates in large plots in the High Plains of Texas indicate that 2 years of alfalfa increased intake rates on Pullman silty clay loam beginning 1 year after the alfalfa was plowed under. Intake rates increased for about 4 years then declined to those under continuous cropping. The highest rate was during the second year after the alfalfa was plowed under.

The study area is unique because most of the irrigated land is one soils series—Pullman. These soils represent more than 5 million acres of the "hardlands" in the Southern High Plains of Texas, New Mexico, and Oklahoma. ♦

From the Administrator:

Cooperation in Woodland Conservation

THE SOIL CONSERVATION SERVICE has a concern with conservation on woodlands, not as a separate activity served by a separate corps of technicians, but as a part of the total soil and water conservation program for any tract of privately owned land.

In speaking to the first Pan American Soil Conservation Congress in Brazil, Secretary of Agriculture Freeman said, "Soil conservation is not erosion control alone. It is a sophisticated combination of technologies fitted to the resources and the people involved.

"Land resources—soil, water, plants, and animals—cannot be effectively used or managed separately. They are completely interdependent. They must be treated as a whole."

Conservation is not the exclusive property of any single agency, individual, or group; it is the concern of all.

Within the Department of Agriculture each of several agencies is involved in one way or another with the conservation of the resources of the Nation. Nearly every department in our Government is also concerned with conservation.

Likewise, at the State and local levels, there are many groups and agencies, both public and private, that have a vital interest in the total conservation effort or with phases or facets of this total effort.

Conservation is complex. It includes many activities, applied to the various resources separately or in combination, to serve the differing interests of different people.

Conservation in its broadest sense can be defined as "wisely using the total human and natural resources of the Nation for the greatest good for the greatest number of people, now and for the future."

Within this concept there is one broad conservation program, having many phases and involving many sciences. As the agency designated by the Department of Agriculture to work cooperatively with soil and water conservation districts in providing technical leadership in soil and water conservation, the Soil Conservation Service administers one conservation program.

To be sure, the program has many phases, including soil surveys, watershed protection and development, snow surveys, conservation on cropland, woodland, rangeland, and others, all combining the many sciences into one soil and water conservation program.

The soil conservationists employed by SCS are general practitioners in the field of conservation. While their basic training may have been in one of several disciplines, they are given training and experience in the other sciences involved.

To keep abreast of today's rapid technological developments, the soil conservationist must be continually trained. For this purpose, SCS employs specialists in each of the disciplines involved. These specialists are experts in their fields of biology, agronomy, forestry, engineering, range, soils, economics, and the like.

With the constant backstopping from specialists, our soil conservationists are able to help landowners develop complete conservation programs for each acre of their operating units. They provide this type of service for all land, whether it is to be devoted to the production of forage crops, row crops, forest crops, or other uses.

The Soil Conservation Service does not, however, provide all the services and facilities that landowners as cooperators with districts need.

A basic conservation plan involving the establishment of woodland conservation practices may call for the services of a professional forester—one employed by the State, by industry, or a consulting forester—to help the landowner plan this phase of his conservation program in more detail and to apply it.

In all the phases of the total conservation program, there are needs for many facilities and many services. When such additional help is needed, the local soil and water conservation district organization is in a logical position to enter into a memorandum of agreement with other agencies and groups to make the services and facilities available.

For an effective program there must be cooperation at each step. The individual land owner or operator must work with his neighbors. He should be willing to help and to be helped in developing the conservation plan and program for his individual unit.

Individuals can work most effectively through organizations like conservation districts and watershed projects, where they can make coordinated use of the services of agencies designated to help with the total conservation program.

And the agencies and groups interested in conservation also need to work together to use their resources to help landowners carry out their conservation objectives.

Reasonable men can always find ways to cooperate on the basis of mutual interest in the kind of conservation program that will best serve the public interest.

D. A. WILLIAMS

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America the Beautiful

America the Beautiful—North Carolina TROUT FISHING IN SILT-FREE STREAM
AVERY COUNTY SOIL AND WATER CONSERVATION DISTRICT

The "America the Beautiful" photo exhibit—one picture for each State, Puerto Rico, and the Virgin Islands—has been reproduced in full-color lithographs suitable for framing. Prints are available from the Superintendent of Documents for 10 cents each or $5.00 for the complete set. Order blanks can be obtained from local Soil Conservation Service offices and at most post offices.

1.6 SO3S

OCTOBER 1966
VOL. 32 NO. 3

Soil Conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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SOIL CONSERVATION SERVICE U. S. DEPARTMENT OF AGRICULTURE

Quality . . .

With all our concern for the economic aspects of recreation as a private business enterprise, we must not lose sight of the fundamental role of recreation itself: to enhance the quality of living.

Seeking to clarify the murky relationship between private and public recreation services, we invited Professor Louis F. Twardzik of Michigan State University to give us his thoughts on the topic.

His statement (p. 63) aptly mirrors and elaborates Secretary Freeman's philosophy (p. 51) that the purpose of resource development is to improve the quality of rural life, not merely to yield a commercial harvest.

In other words, rural recreation is for local rural residents, too.

Resources: The current tide of recreation seekers into the countryside makes it plain that land and water resources demand as much attention as activities and people have in the past in the professions concerned with recreation.

Herein lies the special role of SCS in recreation development—to give skilled direction in the use of land and water, plants and animals, to satisfy recreation needs.

Recreation Specialist Frank Edminster describes (p. 51) a procedure to inventory these resources and match them to human requirements in a community.

And the head of Mississippi's State Association of Conservation Districts, Scott Warfield, tells how one State already is using its inventory (p. 55).

COVER: A wide variety of outdoor fun centers around this flood-prevention structure in the South Fork Watershed Project, Potomac Valley Soil Conservation District, West Virginia.

Soil Conservation

Devoted to the wise use of land and water resources

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SOIL CONSERVATION is the official organ of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. The printing of this publication was approved by the Bureau of the Budget July 25, 1963.

ORVILLE L. FREEMAN — Secretary of Agriculture
JOHN A. BAKER — Assistant Secretary of Agriculture
DONALD A. WILLIAMS — Administrator, Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service,
U. S. Department of Agriculture, Washington, D. C. 20250

BEN O. OSBORN, Editor — GEORGIE A. KELLER, Production Editor

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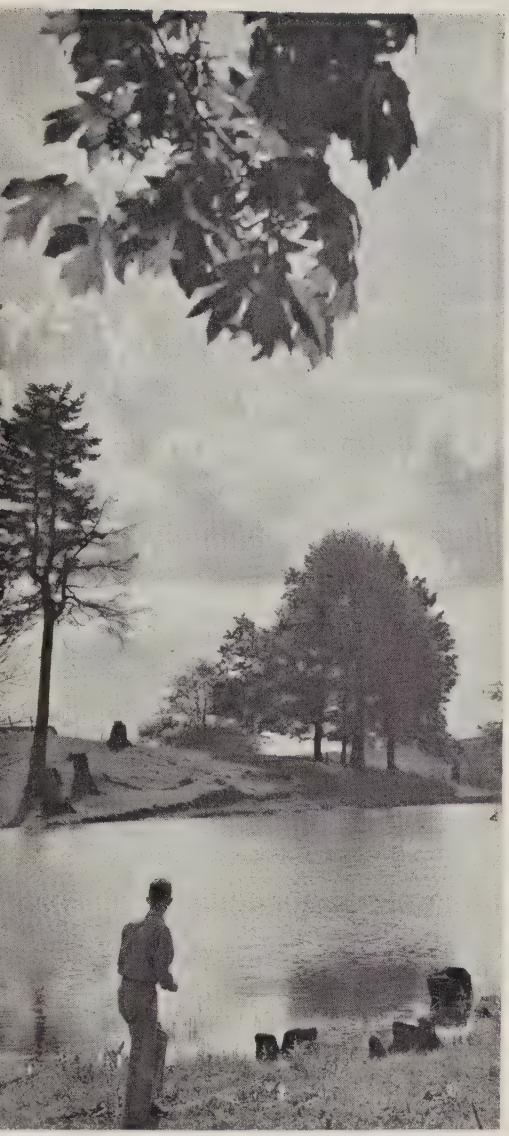
Subscription: $1.75 per year, $2.50 foreign. Single copy, 15 cents. Discount of 25 percent on orders of 100 or more sent to same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D. C. 20402.



Finding the Potentials for Rural Recreation

By Frank C. Edminster
Resource Development Division, SCS, Washington, D. C.

WITH a broad inventory of developed outdoor recreation areas in rural America nearing completion, soil conservation districts, the Soil Conservation Service, and others are addressing themselves to the more difficult—and even more crucial—question of the potentials for further development.

In the past year and a half most of the 3,000 conservation districts of the Nation have been tallying the vacation farms, golf courses, ski areas, fishing ponds, picnic grounds, parks, and other recreation areas—both private and public—within their boundaries and funneling the information to State centers for summarization.

Under the sponsorship of the National Association of Soil and Water Conservation Districts, the inventories have been completed in more than 40 States and are underway in most of the rest. Twenty-three States have published State summaries.

Thus, for the first time, agencies and groups interested in outdoor recreation have adequate basic data on existing developments in both the private and public sectors.

Now NACD and SCS are implementing the second part of a resolution adopted at the 1964 NACD convention, urging that "soil conservation district supervisors appraise the need for and opportunities of developing income-producing recreation enterprises on farms and other rural lands in their district and modernize their district long-range program and annual work plan to reflect the appraised need. . . "

The problem of appraising potentials for further development is much more involved than simply counting the areas and facilities already in place. It concerns the natural resources on which outdoor recreation is based—land, water, air, plants, and animals.

And, to be realistic, it must be related to *people*—their numbers, characteristics, and where they live and their means of getting around, mainly the highway system.

Following a year of study by a group of recreation and resource specialists, a procedure for appraising recreation potential has been developed and tested. It is ready for field use throughout the country this fall following a series of summer training workshops.

Since there is much detail involved in this procedure, I will describe it here only in general outline.

(Continued on p. 53)

Crisis of Quality

By Orville L. Freeman

THE AMERICAN countryside—that expanse of nature separating our cities and towns and rural hamlets—represents all the land we have left to grow in, play in, and build on the American dream.

That is all we have; and when it is divided and divided again for

(Continued on p. 52)

From remarks by the Secretary of Agriculture at dedication of the Arlington watershed in the Little Sioux Falls Flood Prevention Project, Woodbury County, Iowa, June 18, 1966.

Quality

(Continued from p. 51)

the multiple needs of a nation growing rapidly in population, in urban development, in highway mileage, in an array of man-oriented uses alien to nature, this natural landscape that once seemed so limitless shrinks before us at every turn—and we are made aware of a challenging crisis in the countryside.

The crisis we face is a crisis of quality in a nation whose people demand quality in the marketplace but have failed to provide for it in the natural environment.

It is a crisis of quantity in a land whose rich natural endowment has been vandalized to a degree of grave proportions.

But most of all it is a crisis of people—the tragic loss of young minds and spirits of evolving skills and talents.

The recognition of this crisis in the countryside has given birth to a new concept of conservation.

President Johnson expressed it in his message on natural beauty last year.

"Our conservation," he said, "must be not just the classic conservation of protection and development but a creative conservation of restoration and innovation. Its concern is not with nature alone but with the total relation between man and the world around him. Its object is not just man's welfare but the dignity of man's spirit."

Cooperation at the local, State, and Federal levels has brought us a good piece along the road to sound conservation. Now we must build on that cooperative effort, and multiply it by heaping success on success as we have been privileged to do in the past.

To succeed in this mission we will have to carry the word far and wide that conservation—the wise use and development of our environment in the countryside and the city—is everybody's business. It is everybody's problem when greedy or heedless people waste our land, our forests, our fish, our wildlife—dump raw sewage into our streams—pollute the very air we breathe.

Let the word go forth that America as a whole has a stake in the proper use of soil whether privately or publicly owned . . .

—has a stake in fish, game, and other wildlife on private as well as public preserves . . .

—has an interest in parks, playgrounds, and other recreational areas in private or public hands . . .

—is interested in natural beauty in our cities, along rural roads, beside a creek or mighty river . . .

—is increasingly interested in having clean water, adequate water, but not floods.

The new concept of conservation cannot be achieved by government—it can be achieved only by people . . . Government can help—government must help—in all areas, local, State, and national.

* * * *

Truly, this is an exciting era—and there are exciting jobs to be done.

What could be more stimulating . . . more rewarding . . . than the great task of conservation in the broad sense in which we have viewed it?

For the well-being of the whole of the Nation—farm, rural, and urban alike—what greater contribution can be made to this and to succeeding generations than to render it possible for people to live in a rich and rewarding relationship with the world of nature around them? ♦

The types of recreation enterprises recorded in the inventory are (top to bottom): (1) Vacation cabins, cottages, and homesites; (2) camping grounds; (3) picnic and field sports areas; (4) fishing waters; (5) golf courses; (6) hunting areas. Opposite page: (7) Natural, scenic, and historic areas; (8) riding stables; (9) shooting preserves; (10) vacation farms and ranches; (11) water sports areas; and (12) winter sports areas.

Potentials

(Continued from p. 51)

The first step is to recognize that development potential relates to specific *kinds of areas or enterprises*, not to recreation considered as a whole.

For this breakdown, the districts are using the 12 kinds of enterprises used in the "NACD Inventory of Existing Outdoor Private Recreation Businesses:" (1) Vacation cabins, cottages, and homesites; (2) camping grounds; (3) picnic and field sports areas; (4) fishing waters; (5) golf courses; (6) hunting areas; (7) natural, scenic, and historic areas; (8) riding stables; (9) shooting preserves; (10) vacation farms and ranches; (11) water sports areas; (12) winter sports areas. Any of these that do not apply locally are omitted, and any others of importance may be added.

Key elements

The second step is to recognize the *key elements* that determine the potential for development of each type of area or enterprise. These are qualities and extent of resources, location and characteristics of the human population, extent and character of the highway system, and consideration of land use.

In various combinations for different kinds of developments, the following key elements determine the potential: (1) Climate; (2) scenery and scenic areas; (3) natural areas; (4) historic areas; (5) soils; (6) water—both existing areas and potential impoundment sites; (7) wildlife—habitat and populations; (8) people—population and distribution, age classes, occupations, and income levels; (9) location—proximity and access from population centers, a measure of the public road system; and (10) rural ownership and land use pattern.

Step three is to recognize that these various key elements may have different degrees of significance in affecting the potential for each kind of development. For example, for developing water sports areas, the prevalence of water impoundment sites is more important than the quality of scenery.

To account for these variations, each key element is given a numerical weighting, or multiplier, for each kind of development to which it applies. Thus, the key element of water impoundment sites is given a weight of 3 for water sports areas, 2 for fishing waters, and only 1 for vacation farms.

Step four is a process of rating, then scoring, each of the key elements that apply to each type of development being considered.

A *rating* of 0 to 10 for each key element is arrived at by group judgment, based on pertinent facts available and knowledge about the local area.

This rating number is multiplied by the weighting number already assigned to get the *score* for that element for that type of development.

These scores are then added together for each key element to get the total score which reflects the appraisal of potential for the kind of development.

A typical scoring sheet for one kind of development might appear as in the following table:

Water Sports Areas

Key elements	*Multiplier*	*Rating*	*Score*
Climate	1	7	7
Scenery	1	9	9
Water areas			
Existing*	4	10	40
Impoundment sites*	3	2	6
Population of people			
Size and distribution	2	7	14
Age and occupation	1	5	5
Proximity and access			
Proximity to urban centers	1	10	10
Totals	13		91

Total possible score: 130

Adjective appraisal: High, being just within the upper third of the scoring range.

* Possible limiting factors

In the instance given, the area has a high potential for developing water sports areas, although barely

so—a score of 91 out of a possible 130.

This was based heavily on an abundance of existing undeveloped or underdeveloped water, a fairly high population of possible customers, excellent proximity of the area to urban centers where these people live, fine scenery, and good climate. The low score on potential impoundment sites is offset by the high score on existing waters, and the medium score on the age and occupation element is not a very serious limitation.

The asterisks (*) following the two water-area key elements indicate that they can be *limiting factors*. Thus, had there been no undeveloped existing waters suitable for water sports and no or very few good impoundment sites, these vital key elements would render all the rest meaningless. Where such is the case, the key elements that are actually limiting factors are considered first, and an appraisal may sometimes be reached without bothering to score the other elements.

In this manner, a numerical score is reached for the potential of each important type of recreation development in the county or district. A narrative summary gives specific information supporting the numerical rating.

For example, for the water sports area cited above, the "high" score of 91 might be supported by this description: "The potential for developing new water sports areas in Jefferson District is high. Most of this opportunity lies in the western and northwestern townships on the borders of Lake Ontario, particularly around Chaumont Bay, and along the St. Lawrence River, especially around Grindstone Island. These potentials are mainly associated with boating. The prospects are for private developments around Chaumont Bay and public developments around Grindstone Island. While there is substantial development of these water areas at this time, including a general use for vacation homes along the shores, the possibilities for increased boating capacity are many times the present scale of development. This would require the conversion of a limited number of present vacation home properties to more intensive development. In addition to the main potentials in the western and northwestern townships, there is also a limited growth potential for water sports, both boating (including fishing) and swimming, along stretches of Black River, at Perch Lake, and at several of the possible new impoundments."

This type of appraisal is completed for each kind of recreation development. All together, they constitute the full appraisal of potentials.

The job of making these appraisals can be divided roughly into three parts: Gathering statistics, making certain inventories, and the group-judgment appraisal using the factual information brought together.

Much of the statistical data needed comes from the U.S. Census of Population and the Census of Agriculture. The data can most easily be brought together in a central location, such as the State office of a conservation agency. Climatic data can also be obtained from published sources at a central location. The highway information is best obtained locally.

Inventories being made are of the natural resources of particular value in outdoor recreation; namely, natural areas, scenic areas, historic areas, existing water areas, and potential water impoundment sites. In many counties, a wildlife inventory also is needed.

It is not possible at this time to state exactly when this appraisal of recreation potentials will be completed. It is needed in all districts where outdoor recreation is now or is likely to be important. Present plans are that some 1,100 to 1,200 counties will have appraisals made in the next 2 years. ♦

Scouts of Troop 294 work on a log dam that will help stabilize a gully on the Clyde Alexander ranch.

Scouts Tame Ranch Gully

CONSERVATION is everybody's business—and the members of Boy Scout Troop 294 in Monte Vista, Colo., are doing their best to "mind their business." During the summer of 1965, seven Scouts began work on the Soil and Water Conservation Merit Badge.

On the 2,300-acre ranch of Center Soil Conservation District Cooperator Clyde Alexander near Saguache, Colo., the boys went to work on a typical gully. They dug core trenches, cut and laid logs, backfilled, and riprapped with rock. When the noise died down and the dust settled, the boys had 10 log barriers stretching across the small but wild gully.

Two weeks later, the result of their efforts was already visible. Rains had washed trash, rocks, and silt into the gully and had piled it up behind the dams.

With this experience behind them, the boys looked around and saw other gullies which were not treated and had been cut deeper by the rains. Their conservation program had just begun, and they eagerly awaited the opportunity to do more.—FRANK PARRILL, *Work Unit Conservationist, SCS, Center, Colo.* ♦

Just what we needed . . . .

Districts Put Recreation Inventory to Good Use

By Scott Warfield
President, Mississippi Association of Soil and Water Conservation District Commissioners

An SCS-designed lake on the Bienville National Forest attracts thousands of people annually to the surrounding recreation area.

WHEN the National Association of Soil and Water Conservation Districts announced early last year that they would conduct, through their 3,000 affiliated districts, a national inventory of existing outdoor recreation facilities, we in Mississippi were delighted to cooperate.

As a matter of fact, the districts in this State had already started an inventory of this kind, and the subject was not cold. Interested leaders were already well informed, believed there was a definite need for such an inventory, and were in the mood to assist.

When the NACD guides were received, we found they were just what we were looking for, and we got splendid local cooperation from the many individuals, agencies, and groups involved.

Under the capable leadership of Jack Warren, D'Lo, chairman of the Wildlife and Recreation Committee for the Mississippi Association of Soil and Water Conservation District Commissioners, and with technical assistance from the Soil Conservation Service, we had completed and published the Mississippi Inventory by June 30, 1965.

This inventory shows the number of recreation enterprises in Mississippi, operated for profit and by clubs, and gives the acres of land and the acres of water. In more detailed charts and maps, the activities are shown by counties, and further classified as commercial, club, and public developments. At a glance we can determine what kind of facilities exist in any county, the number of each, and the approximate number of people that can be accommodated.

The immediate response to our inventory was gratifying. For instance, a statewide release announcing its completion was used by most of the newspapers and the television and radio stations throughout the State and was carried in some monthly publications. This indicated to us that public interest in outdoor recreational facilities is high in this State.

The inventory itself substantiated the fact that our present facilities are being used. For instance, we recorded a total of 6½ million times, of varying length, during which Mississippi waters were used for recreational purposes. We are certain that hunters took to the field on 1,144,000 occasions during the year and on 409 designated hunting areas.

Exclusive of public facilities, we

Water skiers make good use of the 166-acre lake in the Tackett Creek watershed.

recorded a total of 1,084 recreation enterprises in Mississippi, covering well over a million acres of land and 24,000 acres of water. More than 400 of these enterprises are privately owned and operated for a profit. The remainder are nonprofit clubs.

In all, our facilities — public, club, and private—were enjoyed on more than 12 million occasions during 1964. And this figure does not include the Natchez Trace Parkway and the 17 State parks which, altogether, were used on more than 5½ million occasions.

Since publication of the inventory we have had a number of requests for it, and we are very much pleased that it is enjoying wide use.

Reports to us indicate that the inventory is being used by:

(1) Local soil conservation district commissioners as they develop and revise long-range objectives for the district;

(2) Sponsors of Resource Conservation and Development Projects deciding upon measures to be included in the project plans;

(3) The Mississippi Park System which is preparing, in cooperation with the Bureau of Outdoor Recreation, a long-range State plan to develop adequate recreational facilities;

(4) Soil Conservation Service personnel assisting cooperators at the local level to determine opportunities in the light of existing facilities;

(5) The SCS river basin planning parties who are assembling basic data for basin studies and making projections for future needs;

(6) SCD commissions and watershed sponsors who may be considering recreational developments in small watershed projects.

I have purposely listed item 6 last, because I wanted to elaborate. Through the years, we have had considerable recreational use of both flood control and Public Law 566 floodwater-retarding structures, and we have long appreciated the potential which these projects contain.

This spacious vacation home is being built on the shore of a small watershed lake on land that formerly could not be used because of flood hazard. Quail hunting (below) is a popular sport that gains from conservation-planned land use changes.

In some areas of our State resort homes are going up.

In one county alone three hunting clubs have formed to take advantage of the increased game.

On the banks of one structure, the Mississippi Presbytery has already begun construction of a $50,000 church camp.

The inventory listed a conservative 29,525 visits in 1964 on floodwater-retarding structures not yet developed for recreation.

These are just a few of the signs which lead us to believe that outdoor recreational development may have a significant future in Mississippi.

That others are thinking along the same lines is evidenced by the fact that one-half of all current requests for watershed planning assistance in this State include recreational purposes on at least one site.

An increasing number of requests for information and technical assistance are also coming in from farmer-cooperators throughout the State. We feel that the Outdoor Recreation Inventory will be a valuable tool in advising them.

Finally, we in Mississippi are hopeful that the districts can keep ahead of this interest in outdoor recreation, giving leadership and guidance to this recent development in our program. ♦

Ohio Farmers Switch to Golf But Keep the Conservation

By Don Lebold
Soil Conservationist, SCS, Lancaster, Ohio

BILL and Dick George follow about the same basic conservation patterns on the family farm in Fairfield County, Ohio, as their father, Carl, began 30 years ago.

The main difference is the crop. They specialize in recreation with golf and swimming on the land their father used for grain crops.

The senior George became a cooperator with the newly formed Fairfield Soil and Water Conservation District back in 1945. With planning help from Soil Conservation Service technicians aiding the district, Mr. George established some much needed erosion-control measures. His square fields became 39 acres of contour strips designed to hold as much water as possible in the soil. Diversions, 950 feet across the slopes, carried excess runoff water slowly out of his fields, leaving topsoil in place.

Changing the crop

About 150 rods of fence were moved or rebuilt to fit the new land patterns. The conservation plan called for 69 acres of cropland with a 3-year crop rotation in the bottom land. A 4-year rotation, including 2 years of meadow, was prescribed for the contour strips. The new conservation plan proved itself in growing profits, and in 1949 Mr. George purchased an additional 100 acres and added 25 acres of strip cropping to his conservation plan. His dairy herd was increased to 30 cows, and the farm was now supporting two families.

In 1955, Bill, who had been working away in radio-TV advertising and promotion, returned, and after much discussion with Dick about the growing population of Lancaster and increasing demand for outdoor recreation, the two decided to change the primary farm operations from grain and grass to golf and grass. As Bill said, "I complained about the present courses being too crowded and decided to build my own, and this is just what we did."

One set of contour strips was replaced by the fairways and greens of their first nine-hole course.

The SCS was again consulted, and a pond was laid out between the fifth and sixth fairways. This pond provided both a water supply and esthetic appeal. A clubhouse was built on the knoll overlooking the golf course and provides a splendid view of the valley below, thus suggesting a fitting name, Valley View Golf Club.

Conservation still needed

The recreational demand increased so rapidly that in 1962 a swim club was organized, and an olympic pool was built for community membership. In 1965 Bill and Dick added the second nine-hole course covering the original contour strips laid out 19 years before. With SCS help, two more ponds were laid out. Part of the area once in grain crops and now in meadow was converted to a bluegrass and fescue mixture for hard usage on the fairways, a fine bent grass for the greens, and a mixture of trees and grass for the open areas between the fairways. All trees and shrubs are located with an eye for beauty as well as utility, and a planting of some 10,000 mixed varieties of pine for "rough" use was made in April 1966.

The change from agriculture to recreation has greatly increased

Visitors tee off at the first hole of Valley View Golf Club on the George farm.

Area residents enjoy the olympic-size pool west of the new nine-hole golf course.

the need for good conservation measures. Drainage practices call for removal of excess water in a few hours rather than a few days. The novel idea of spruce for markers along the fairways and as a measure of distance to the greens makes new uses of trees which had never been previously considered. All of the land is protected by either grass or trees.

Sitting in his new home and discussing the entire operation, Dick remarked, "You know, we had 26 people employed here most of last summer, and the net income is more than 5 times what it was when we were kids. Who would have thought that that many people would ever have been working on this old farm?"

As to the future, who knows? Dick says it is very possible the remaining cropland, meadow, and pasture, used primarily to supply a flock of sheep, may someday be used for additional recreational enterprises. This farm is an outstanding example of how a successful recreational enterprise calls for even greater use of good soil and water conservation measures. ♦

Scouts Honored for Conservation

CLIMAXING a conservation program involving some 5½ million Boy Scouts and 300,000 acres of council-owned camp lands, the 1966 U.S. Department of Agriculture Council Conservation Awards are being presented at regional ceremonies to winning Boy Scout councils throughout the country.

Highest honors, the USDA Gold Seal Award, went to Theodore Roosevelt Council of Phoenix, Ariz., which will receive the citation on November 11 in Honolulu, Hawaii, at the Region 12 meeting.

First of the 12 Green Seal Council Conservation Awards to BSA regional winners was made in Dallas on May 19 to Indian Nations Council from Tulsa, Okla. Texas State Conservationist H. N. Smith presented the award during the National BSA council meeting.

Green Seal Awards ceremonies have also taken place for Kansas City Area Council, Kansas City, Mo.; Yellowstone Valley Council, Billings, Mont.; and Great Plains Area Council, Minot, N. Dak.

The remaining eight Green Seal Awards will be made during regional meetings in October and November. Winners include Pioneer Valley Council, West Springfield, Mass.; Nassau County Council, Roslyn, Long Island, N. Y.; Allegheny Council, Pittsburgh, Pa.; Mountaineer Area Council, Fairmont, W. Va.; Istrouma Area Council, Baton Rouge, La.; Sunny Land Council, Sarasota, Fla.; Potowatomie Area Council, Waukesha, Wis.; and Catalina Council, Tucson, Ariz.

All but two of the winning councils specifically cited the Soil Conservation Service for help in planning the conservation programs for the camp property. Among the projects undertaken by the 13 winning councils were erosion control, stream improvement, wildlife habitat management, tree and grass planting, and trail building.

Boy Scout leaders have enthusiastically endorsed the annual USDA Council Conservation Awards as an incentive to a realistic interest in resource conservation and development.

With the more than 800 campsites owned by Boy Scout councils serving as outdoor conservation laboratories, the Scouts are able to participate in practical work experiences as well as to receive on-the-ground training in land management and resource use planning. As they work, they learn that conservation and planning are the keys to natural beauty in America. ♦

Soil Test

If a chemical soil test is to be of any value, a soil sample must represent a substantial area.

Water fun for everyone . . .

Small Watershed Lakes Meet Recreation Demand

Ralph C. Wilson
Recreation Specialist, Watershed Planning Division, SCS, Washington, D. C.

WHEN our forefathers included in the Bill of Rights a provision guaranteeing us the right to "the pursuit of happiness," they undoubtedly never dreamed that this "pursuit" would, less than 200 years later, turn into a mad "stampede."

Caught up in this stampede—and spurred on by more leisure time, more spendable income, and more mobility—people throughout America are seeking recreation, particularly in the out-of-doors, in ever-increasing numbers. As a result, existing public recreation areas and facilities in many parts of the Nation have become seriously overcrowded. The demand for water-oriented outdoor recreation, such as swimming, boating, fishing, water skiing, and camping, has been especially heavy.

Small watershed projects under the Watershed Protection and Flood Prevention Act (Public Law 566) are proving to be one of the most effective ways to meet the demand for more public water-based recreation facilities.

Development of recreation facilities on the small lakes created by floodwater-retarding structures was accelerated by the amendment of the Act in 1962 to allow the Federal Government to give technical and financial help to project sponsors for this purpose.

The Federal Government may now pay up to 50 percent of the costs of enlarging dams for public recreational use; acquiring land easements, and rights-of-way for the larger reservoir and adjacent land; and for construction of minimum basic facilities needed for public health and safety, access to, and enjoyment of the recreation area.

Since 1963, the first year the recreation provision of the Watershed Act was made available, a total of 95 public recreation de-

A family outing at one of the picnic sites developed by the Forest Service above a flood-prevention impoundment built by SCS in the Potomac Valley Soil Conservation District.

velopments in 81 different watershed projects in 31 States have been approved for operations.

When completed, these developments are expected to provide more than 5 million user-days of water-based recreation each year. This represents a financial investment of almost $39 million for recreation, with the Federal Government paying about $19 million and local sponsoring organizations the other $20 million.

In addition to the recreation facilities already completed or under construction, another 72 developments in 61 projects in 25 States have received preliminary approval and are now in various stages of planning.

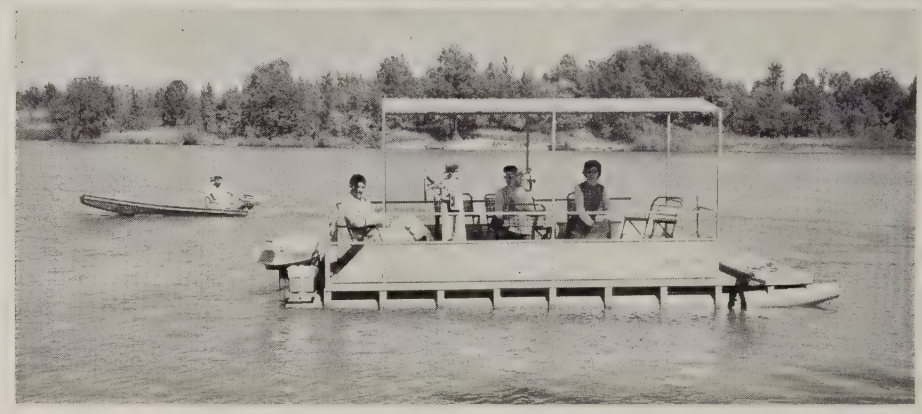
In still another 28 projects, Federal cost-sharing has been approved for enlarging the dams for recreational purposes, although no additional land or facilities for recreation are involved.

The local sponsors

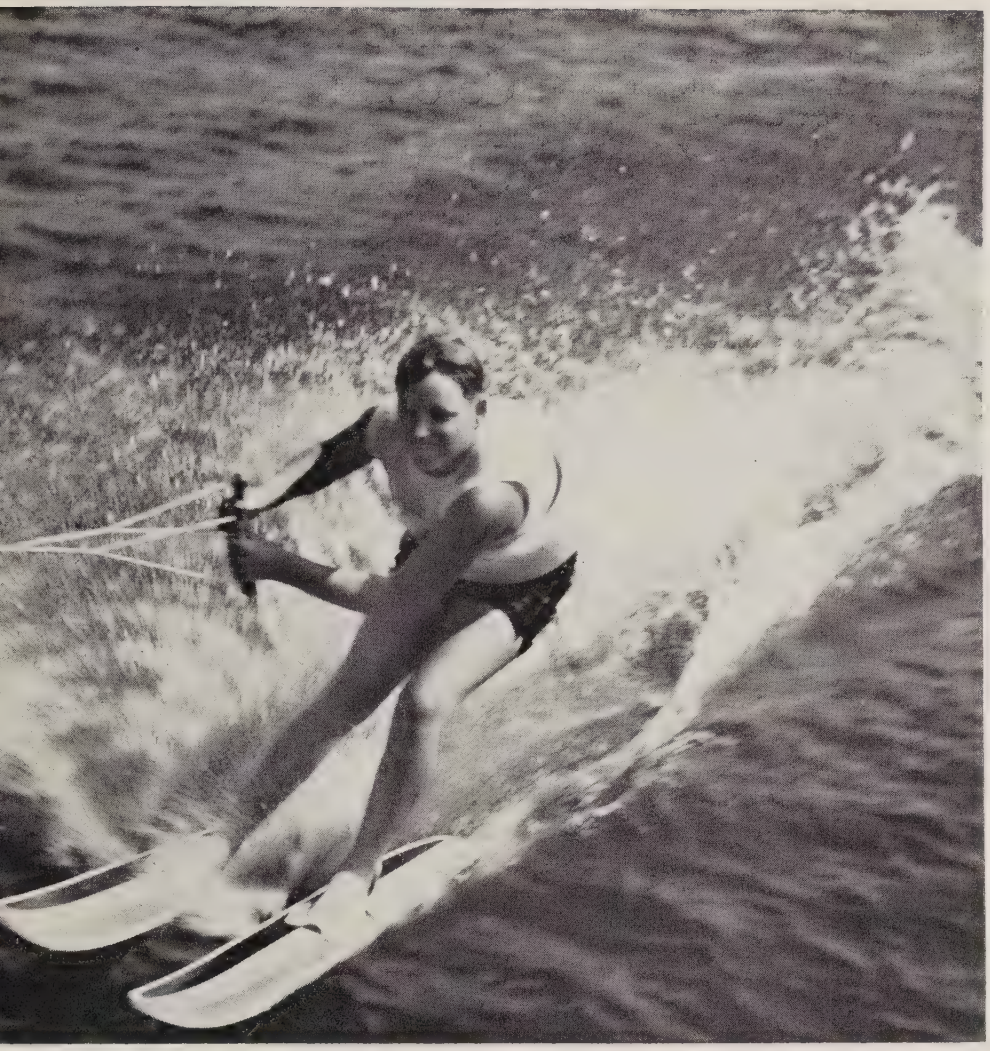
Local sponsoring organizations include State agencies, municipal and county governments, soil and water conservation districts, conservancy districts, and others so authorized by the State Government.

In Kentucky's Mud River Watershed Project, the State Department of Fish and Wildlife Resources is sponsoring the recreation phase of the project to serve the needs of an estimated half million visitors annually.

One of the project's 26 flood-detention reservoirs was enlarged to create an 826-acre lake. Together with a 300-acre State park which has been developed on a portion of the shoreline, facilities are avail-



Girl Scouts (top) engage in waterfront activities at Camp Echoee in the Sautee Creek watershed, Georgia. In the Caney Creek watershed, Arkansas, the ladies enjoy a tranquil day as a fisherman passes in the background. An aerial view (below) shows a typical small watershed lake in the French Lick watershed, Indiana.



A water skier finds a lake in the Caney Creek watershed, Arkansas, to his liking. A bathing beach where none existed before now attracts visitors to a flood-prevention site in the George Washington National Forest, West Virginia.

able for swimming, fishing, boating, water skiing, hiking, picnicking, and camping. On 1 recent weekend more than 700 Boy Scouts walked the park's 20 miles of scenic hiking trails.

Tourists, attracted by the new lake and its recreation facilities, are adding greatly to the local economy, which in the past has depended primarily on agriculture.

Birch Lake, a flood-detention reservoir in Wisconsin's Twin Parks Watershed Project located 1 mile north of the town of Barneveld, provides swimming and fishing for hundreds of people each summer. Prior to construction of the reservoir, swimmers had to travel to another town 10 miles away.

Boy Scouts from Madison and Barneveld use Birch Lake for cookouts and for conservation projects, such as construction of nature trails and revegetation of streambanks. More than 200 anglers were present on opening day this year when the lake was opened for trout fishing for the first time.

Fishing and boating

The people of Plentywood, Mont., are enjoying their third year of fishing and boating on a 90-acre multi-purpose lake in the Box Elder Creek watershed.

Under the joint sponsorship of the Sheridan County Soil and Water Conservation District, the reservoir provides storage capacity for both flood prevention and recreation and is stocked with trout by the Montana Fish and Game Department. Picnic tables, a boat launching ramp, and sanitary facilities now being added should make the development an even more popular spot in the years ahead.

A recently completed multiple-purpose reservoir (flood prevention and recreation) in the Spaulding Pond Brook watershed in Connecticut provides the only public bathing area for the residents of Norwich and adjoining towns.

Several thousand bathers daily use the pool and surrounding area. The city of Norwich also conducts swimming classes and has provided picnicking facilities nearby.

The Colorado Game, Fish, and Parks Department cost-shared the recreation pool and supervises the fishing, swimming, boating, water skiing, camping, and picknicking activities at the 500-acre Ramah Reservoir in the Big Sandy Creek watershed, Colorado.

With more than 50,000 visitors annually, recreational benefits at the reservoir are exceeding the average annual costs of the entire watershed project, which includes 13 floodwater-retarding dams in addition to the Ramah multi-purpose reservoir.

For use of groups

Although private groups such as churches, youth organizations, civic and service groups, sportsmen's clubs, and the like, are not eligible for cost-sharing assistance, they may receive technical help from the Soil Conservation Service in planning recreational facilities in and around the small watershed lakes.

Many private groups have recognized and taken advantage of the recreation potential of watershed lakes. A number of groups have granted easements to build dams on their property and paid the additional costs to enlarge the dams for recreational purposes.

For example, the Tennessee-Arkansas-Mississippi Council of Girl Scouts is sponsoring the recreation development around one of the reservoirs in Tennessee's Porters Creek Watershed Project as a permanent summer camping area for the council's 9,000 Scouts.

The council owned 1,200 acres on which a watershed flood-detention dam was to be built. The council granted an easement to build the dam on its property and paid $56,000 to enlarge it for recreational purposes.

How financed

How was it financed? Through the sale of more than 300,000 boxes of cookies by Girl Scouts in the 3 States!

When completed, the camp will house more than 500 girls and their counselors at one time.

The Quivira Boy Scout Council in Kansas has contributed about $110,000 toward the acquisition of land and additional costs involved in the construction of a 400-acre multiple-purpose reservoir which is the focal point of the 2,800-acre Quivira Scout Ranch.

Seven separate camps have been established around the lake to serve 15,000 boys in the council area. The lake serves all aquatic activities, including swimming, life saving, sailing, canoeing, and fishing.

In addition to the broad social and individual benefits recreation developments produce, they also bring about desirable economic benefits. They enhance community values by creating a better place to live and increasing land values. Often, public recreation areas that draw people from a considerable distance create a demand for new services and businesses that aid in boosting the local economy.

Some 8,000 small watersheds throughout the United States still need project action to solve land and water problems. Several thousands of these projects have potentials for recreation developments.

Indications are strong that, for a long time yet to come, recreation developments in multiple-purpose small watershed projects will continue to play a vital role in meeting the Nation's growing recreation needs. ♦

Outlook for Farm Co-ops Discussed

USDA will join with local farmer-owned cooperative businesses across the Nation in observing October as "Cooperative Month."

Vice President Humphrey has been invited to open the first of a series of conferences at USDA, scheduled to begin on October 3, to discuss many aspects of progress and opportunities of the Nation's cooperatives.

Speakers and panel participants at these meetings and others throughout the country will stress the impact cooperatives have had in many areas of the economy and explore their opportunities for increasing social and economic services to people in the United States and other countries.

Eleven Federal agencies are joining with cooperatives in the observance, and Governors of as many as 35 States are expected to issue proclamations in recognition of Cooperative Month.

Denmark has been invited to present an exhibit in the USDA patio of the 100th anniversary of cooperatives in that country.

In addition, cooperatives in many States are planning programs during October, ranging from workshops to open house days at co-op facilities.

Since enactment of the Cooperative Marketing Act 40 years ago, USDA has worked closely with rural interests to aid the development and growth of strong local farmer cooperatives. The Farmer Cooperative Service has leadership in this activity. ♦

Field Evaluation Plantings

Field evaluation plantings of grass-clover mixtures on poor soils in western Oregon by the SCS plant materials center at Corvallis promise to find a combination that will succeed on soils presently regarded as nearly worthless.

Local Environment for Recreation

By Louis F. Twardzik
Associate Professor, Park and Recreation Administration and Recreation Specialist, Cooperative Extension Service, Michigan State University, East Lansing, Mich.

IN HIS QUEST for material prosperity, man has reshaped his environment without giving much consideration to the spiritual or esthetic values of life.

A number of national programs are now being implemented which objectively place the improvement of man's environment in high and equal priority with other national goals. The programs are called variously, the "New Conservation," "Natural Beauty," "Quality Environment," and "Creative Conservation." This new approach is encouraging.

But, obviously, enlightened national or State policy in itself will not produce desired effects or goals. It will remain the work of local leadership to determine the ultimate usefulness of these programs.

A serious fault

One of the more serious misinterpretations of creative conservation and the quality environment is emphasis at the local level on equating these terms exclusively with economic gains. The essence of these new national programs is that our natural and community resources now need to be also utilized for improving the quality of day-to-day life, of the environment, for people in the rural community.

Mrs. Johnson is not planting flowers and trees all across the United States to increase the gross national product. But this is precisely how some local leaders use these new programs, as additional devices for attaining immediate economic gains, usually through programs to attract seasonal tourists.

How many tree planting and beautification programs in rural communities include all the streets of the town as compared to those that improve only main tourist routes? How many recreational areas are being located, designed, and developed in rural communities for the people of the community and how many for the visitors to the community? Accessibility of the area to the residents, their preferences and needs, are important factors in determining the type, amount, and location of recreational areas and programs in urban areas. They are not always prime considerations in rural areas.

The intent of the new programs of beauty and environment is not to provide short range economic gains to a community, but rather to improve the overall living conditions for its residents. If this premise stands in local areas, then the more attractive communities, and the kind of leadership that made them so, will begin to attract, as well as retain, more people, more industry.

It seems that too many community leaders think of their areas as prime resort areas; few are. The dollars left behind by seasonal tourists do not by themselves reflect the meaning of President Johnson's comments about "the dignity of man's spirit." Nor will they by themselves lay the foundation for an area that will attract "new people and industries," referred to by Secretary Freeman.

Where local leadership takes a hard look and then begins to plan and develop the rural community on the basis of serving its people with a quality environment, in meeting the recreation and beauty needs of its residents, stable economic gains are more apt to follow. Let's look to all of our streets, not just the main street; let's plan quality neighborhood parks and playgrounds and not accept a few swings and slides on a school lot as being adequate.

A larger commitment

Farm income-producing recreation enterprises are growing in number and importance. It has to be assumed that during the next decade a significant number of these farm enterprises will survive as successful recreation operations. But this is only one part of a program to change and protect the quality of the rural environment. There surely is a larger commitment by local leaders to follow through on creating a total community environment for those who live in rural areas—not because of extra income, but because it is a level of life that rural residents deserve, as do the people who live in urban areas.

During the postwar period of the mid-1940's, many of these amenities came to rural areas as they accepted more and more of the overflow of urban centers. With the increasing population and the subsequent economic linkages, the traditional county park and recreation departments were established as public agencies. As recognized public agencies, comparable to the county health department and county department of roads, the park and recreation agency employed people professionally trained in parks and recreation to fulfill these responsibilities.

However, this seldom occurred in the sparsely settled counties. Instead, a variety of administrative arrangements were made be-

tween county road commissions and school districts and volunteer groups, often with a patchwork of budgets and transferring of funds to take care of sudden needs, installing more picnic tables, oiling a dusty road, or purchasing playground equipment.

Districts can help

It's a time of change, and there is a need to discover better ways to provide for these changes. If the older institutional forms are not working as needed, why not make alternative arrangements? Why shouldn't the soil conservation districts as governmental entities assume the responsibility for providing park and recreation opportunities and the quality environment in rural areas?

SCS Administrator D. A. Williams, in commenting recently on a report of the Special Committee on District Outlook of the National Association of Soil and Water Conservation Districts, said that there is a need for local, legal bodies to represent all the people, involve all the people, all the community interests, and accept and carry out responsibilities in connection with resource programs and projects. He added that "the committee believes that soil and water conservation districts can be the directing and coordinating bodies to perform these functions at the local level."

And why not? Local leadership in rural areas throughout the country is represented by 3,000 legal entities, the soil and water conservation districts. Obviously, an interest in parks, recreation, and natural beauty already exists within many districts. The only comprehensive nationwide inventory of farm recreation enterprises was completed by the National Association of Soil and Water Conservation District last year; and this year, the Soil Conservation Service is taking leadership in preparing for a nationwide appraisal of potential for outdoor recreation development by counties.

Of course, some of these community park and recreation responsibilities differ vastly from those requiring an expertise in terracing and erosion control and will in addition require change in outlook and technical competence in the districts and those agencies that assist them. But the districts represent local leadership, they are governmental units, and they have a traditional commitment to resource development. This is the time for a change in local recreation, as a service for people who live in rural areas. This change has already taken place at the national level and in many States. Possibly the answer to this local need is for soil and water conservation districts to become more actively involved in providing for parks, recreation, and natural beauty. ♦

Recreation Forum on Man and Nature

THE National Recreation and Park Congress, which will be held in Washington, D. C., October 9 to 13, will have as its theme, "Great Things for Humanity." More than 3,000 national, State, county, and community recreation and park leaders are expected to attend.

Among top Government officials scheduled to speak are Orville L. Freeman, Secretary of Agriculture; Stewart L. Udall, Secretary of the Interior; and Robert C. Weaver, Secretary of Housing and Urban Development. Laurance S. Rockefeller, President of the National Recreation and Park Association, will be the keynote speaker at the opening general session, Monday morning, October 10.

The National Recreation and Park Association, sponsor of the Congress, was formed in August 1965 as a result of recognition that sweeping social changes and increasing demands of an expanding population called for more imaginative and closer cooperative effort among leaders in recreation, parks, and conservation.

Four well-established national organizations joined with the National Recreation Association to form the new group: The American Institute of Park Executives; American Recreation Society; American Association of Zoological Parks and Aquariums; and National Conference on State Parks.

NRPA is a nonprofit, educational, and public service organization. Its goals are:

(1) To help preserve the balance between nature and man to allow him to live harmoniously with his surroundings both in the city and in the countryside;

(2) To help communities, States, and the Federal Government provide opportunities for recreation and enjoyment of the natural environment for our growing population;

(3) To help all Americans develop a productive outlook and philosophy for the use of leisure time.

Commenting on the formation of NRPA, Laurance Rockefeller said recently that, "The establishment of this Association gives the broad recreation and park field a solid front, one voice, and the unity of purpose to move forward."

Rockefeller and James H. Evans, Chairman of NRPA's Board of Trustees, also serve on the 12-man Citizens Advisory Committee on Recreation and Natural Beauty which will advise President Johnson and his recently appointed Council on Recreation and Natural Beauty. Mr. Rockefeller is chairman of the committee.

Completed RAD Projects

Completion of 3,702 Rural Areas Development projects during 12 months ending August 1 brought the total of RAD projects to 11,791. ♦

Say goodby to ditches . . . .

Sprinklers Save Water, Time, and Soil on Colorado Ranch

"DITCH irrigating is a waste of time; sprinklers are the thing for this type of country," says a Colorado ranch manager. And he has the results to back up his opinion.

C. E. "Al" Allen, manager of the J Bar L Registered Hereford Ranch at Basalt, Colo., began replacing his ditch irrigation system with sprinklers 4 years ago.

The system has reduced manhours needed for irrigation by more than 80 percent and eliminated costly maintenance of 3 miles of ditches. Fields are easier to work without the ditches, and Allen says new seedings are established in about one-third the time. The new system requires only two-fifths of the water previously needed, thus increasing efficiency of water used by 250 percent.

The J Bar L Ranch, owned by Dr. John Schweppe, lies in a picturesque mountain valley at 8,200 feet elevation. Originally homesteaded in 1872, the 600-acre ranch depends on Taylor Creek for irrigation water. The stream has a good flow during the spring thaw, but the flow drops off rapidly about mid-June. Ground faults are common in this area, and some cut across Taylor Creek near the meadows. The reduced flow is not enough to get across the faults, and most of the water disappears into the ground.

The loamy soils absorb water fast, and water loss in ditches was high. The steeply sloping fields, common in the mountain areas, eroded easily and were hard to flood irrigate. The combination of short-growing season, undependable water, and high water intake rate severely limited productivity. Something had to be done to assure adequate feed for the cow herd.

In 1962, Soil Conservation Service technicians, assisting the Mt. Sopris Soil Conservation District, helped Allen develop a sprinkler system as part of his conservation plan. The system has more than a mile of buried 8-inch steel pipe. About half of the pipe was used to change the point of diversion upstream to intercept the water before it reached the faults. Almost 6,000 feet of 4-inch aluminum pipe distributes the water from the 8 hydrants to 94 sprinkler heads. This permits irrigation of up to 13 acres a day. More than 200 feet of fall from the automatic screener to the first hydrant provides adequate pressure.

The entire system, including tees, elbows, valves, and screener, cost about $32,000 installed. The Agricultural Conservation Program shared the cost of the structures and buried pipe.

In applying his soil and water conservation plan, 3 acres of rangeland has been reseeded, one spring has been developed by building a collection basin and trough, and the pastures have been divided so that the grazing can be better controlled. Seepy meadow areas are gone. Even high, formerly dry areas get ample water.

The J Bar L has a permit to graze cattle on National Forest lands. Next year deferred rotation grazing will be started on these lands to improve the range condition. This overall conservation program has provided for 28 more cattle to this time.—CHARLES J. MALONE, *Range Conservationist, SCS, Glenwood Springs, Colo.* ♦

Allen's homemade trailer makes it easy to move 40-foot sections of aluminum pipe around for sprinkler irrigation of meadowland at the J Bar L.

Conservation a Tradition With Dakota Family

THE PRACTICE of soil and water conservation is a longtime tradition in the Stanley J. Jensen family on their farm in the Lincoln Soil and Water Conservation District, South Dakota.

The majestic trees of the 30-year-old farmstead windbreak are evidence of it. The windbreak, in addition to protection and comfort, provides a beautiful setting for the Jensen home.

Stan Jensen's father, James, started contour farming in the mid-1930's. The practice was new in that area in those days, and the landowners of the community wondered about it. More and more of them followed the example of the elder Jensen. Contour farming is an accepted way in the area now.

The son, Stanley, is an enthusiastic cooperator with the Lincoln District. He is making fast progress in applying complete soil and water conservation.

In 1958 he started terracing a 96-acre field. He added more terracing each year. In 1965 he built two parallel terraces and observed that, during a 4-inch rain, no runoff left the field.

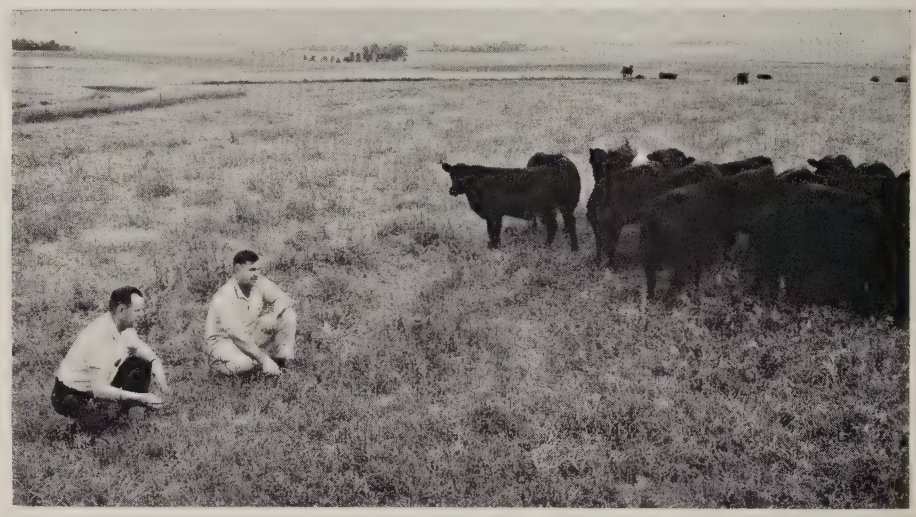
Grass, legumes, and livestock are key elements in the Jensen operation. Jensen rotates bromegrass and alfalfa with corn and soybeans.

He grazes the bromegrass-alfalfa pastures 2 weeks and rests them 4. He cuts hay from 1 pasture early in the season. A recent cutting from 14 acres produced 1,620 70-pound bales, and 84 cows later grazed the pasture.

In 1958 Jensen established a wildlife area near a stock pond. The cover and food have increased the pheasant population. Deer, too, are a common sight on the farm.

Mrs. Jensen values the wildlife area for still another reason. The Nanking cherries make a tasty jelly. Mrs. Jensen, who once was

A protected wildlife area adjoins the stock pond at the edge of a tame pasture on the Jensen farm. The owner shows then SCS Area Conservationist Palmer Skalland a Nanking cherry tree planted for cover.



The Jensen cattle thrive on well-managed bromegrass and alfalfa pastures. Skalland (left), and Stanley Jensen, are pleased with the results. Contour cultivation (below) has been the practice on the Jensen farm for more than a generation.

Stanley Jensen was himself a youngster when his father planted the farmstead windbreak. His own family enjoys its beauty and protection.

employed as a secretary by the Soil Conservation Service in Idaho, has a more than ordinary interest in the soil conservation plan they are applying.

Stan Jensen's enthusiasm in the field of soil and water conservation figures in his work as a member of the State Agricultural Stabilization and Conservation Committee which administers the Agricultural Conservation Program in South Dakota. He also is active in the South Dakota Crop Improvement Association and in his Rural Electrification Cooperative. He serves on the local school board and on the board for his church. ♦

Mississippi Cattle Thrive on Bahiagrass and Woodland Forage

By David W. Sanders
Range Conservationist, SCS, Hattiesburg, Miss.

IN the longleaf-slash pine area of south Mississippi, many livestock farmers can't see the grass for the trees.

Not so with Virgil Stockstill and his wife who have a 320-acre woodland-livestock farm in northwest Hancock County. The Stockstills, cooperators with the Hancock County Soil Conservation District, have 27 acres of bahiagrass and 290 acres of well-managed longleaf and slash pine, of which 100 acres is fenced.

Stockstill is a "part-time" farmer, so Mrs. Stockstill spends much of her time looking after the livestock. The Stockstills keep 25 to 30 brood cows. Their management system consists of grazing the bahiagrass pastures during the growing season, using the woodlands to supply additional forage as needed. The woodland forage is also used while they get a cutting of bahiagrass hay in late summer.

Mr. Stockstill usually winters his livestock in the woods and supplements their diet with cottonseed meal and salt. He also feeds a mixture of hay and ground corn to the cows with calves.

Stockstill controls his breeding to take advantage of the lush grass

A group of Mississippi cows grazing on native woodland forage.

period starting in April. The calves are dropped in January and February and are at least 6 weeks old before grass greens up in the spring. This enables him to sell a good heavy calf about the middle of August and gives the cows time to gain weight before winter. When this type of breeding program is completely established, it will eliminate the cost of extra feed needed for cows with young calves during the winter.

"I wouldn't be able to carry over 12 brood cows if it weren't for my woodland forage," Stockstill says of his system. He believes in using his land to the maximum, but not to the extent of impairing its productivity. He practices proper grazing of both woodlands and pastures.

He also manages his woodland on a selective cutting basis. He sells pulpwood if a thinning is needed, but leaves the best trees so they can be sold later for high quality poles.

This is one example of how landowners are using woodland forage to supplement their grazing program in southern Mississippi. This is an area where, quite literally, you shouldn't overlook the grass while you watch the pine trees grow to maturity. ♦

Two New RC&D Projects Authorized

TWO NEW Resource Conservation and Development Projects recently were authorized for Federal assistance in operations. They are the Tradewater River Area RC&D Project, Kentucky, and the Cherokee Hills RC&D Project, Oklahoma.

Tradewater River Area, Ky.

The Tradewater River Area RC &D Project covers 1,718,400 acres in the 6 Kentucky counties of Caldwell, Christian, Crittenden, Hopkins, Union, and Webster. This area is predominantly rural, with a population of around 146,000. The major part of the area is in cropland, woodland, and pasture, and more than half of the cropland has a water-erosion problem. Coal is strip-mined in 5 counties, and mining operations are increasing.

The primary objective is to broaden economic opportunities in the area by better water management, erosion control, flood protection, and community improvements.

Sponsors of the project are the six local soil conservation districts. They expect to receive assistance from three Federal departments, nine State departments, and the University of Kentucky.

Over the next 15 years, the benefits from structural installations and land-treatment measures are expected to amount to $20 million. Activities stimulated by the project during this period are expected to provide additional continuous employment for 3,000 people.

The plan provides for acceleration of soil surveys, conservation planning and land use adjustment, forest management and marketing, roadbank stabilization, and strip-mine area treatment.

Among the 140 other measures planned are small watershed projects covering 40 percent of the entire area, public water supply measures, industrial and educational planning, sewage disposal systems, and recreational and health developments.

Some of the current action or plans for the immediate future are: Hern-Henshaw and Kenneth Roberts agricultural water-management improvements, flood-prevention developments on Owens Creek and Muddy Fork Creek, a county-wide water district for Union County, an alfalfa pelleting mill for the town of Fredonia, sewage disposal facilities for the city of Marion, and a recreation center and housing development for the city of Providence.

Cherokee Hills, Okla.

Sponsored by the Adair, Cherokee, and Delaware County soil and water conservation districts, the Cherokee Hills RC&D Project lies in the heart of the Ozark Highlands, an area rich in Cherokee Indian history.

It covers 1,325,400 acres of rolling hills and valleys in Adair, Cherokee, and Delaware counties. More than 67 percent of the project area is in forest land, 70 percent of which is in small private ownership. About 28 percent is in cropland and pastureland.

Objectives of the project are to help achieve desired beneficial economic and environmental changes by: (1) Accelerating the pastureland program through revegetation of former cropland areas; (2) providing land treatment to prevent erosion of soil and excessive runoff of water; (3) encouraging development and location of industry in the area; (4) developing recreation and tourist facilities; (5) improving woodland income; (6) upgrading housing; and (7) promoting training programs for the underprivileged.

Some of the planned measures are: Accelerated conservation treatment on 195,000 acres of land; completion of one Public Law 566 small watershed project and installation of other water management and water control structures; improved recreation and fish and wildlife habitat through stream development, hunting areas, and historic developments; installation or expansion of hardwood market, gravel industry, livestock market, cold storage facilities, and fish and poultry processing plants; and expansion of community facilities such as parks, fairgrounds, and water and sewage facilities. ♦

CONSERVATION PROFILE

Sam Tsukamoto

California

Japanese-American serves his neighbors and district

A STRAWBERRY GROWER near the State Capital of California has been a driving force behind his Nisei neighbors' enlistment in the soil and water conservation program.

Sam Tsukamoto served on the organizing committee of the Florin Soil Conservation District and has been a director for most of the 13 years of the district's history.

The Florin District, comprising 90,000 acres, south of Sacramento, contains many truck farms operated by Japanese Americans. They recognize Tsukamoto as a conservation farmer, and his bilingual abilities make him an asset to the district board.

Sam Tsukamoto provides leadership between members of the Japanese-American community and the district to insure total soil and water conservation, including wildlife and beauty.

Economic pressures from nearness to a large city have made land a premium. Because of this, land-leveling practices and irrigation brought all possible areas with suitable soil into production, destroying wildlife habitat.

Seven years ago, the district started an active wildlife habitat program and to date has been instrumental in getting 45,000 plants on 136 farms. About 116 acres has been set aside, fenced, and planted to provide wildlife cover and food. Pheasant, quail, and cottontail rabbits have been placed in these areas by the State Department of Fish and Game under district sponsorship.

The land in the Florin District historically abounded in small game, but during the 1950's and early 1960's, clean cultivation of all the land literally destroyed their habitat. Truck farming operations where all land is double or triple cropped contributed to their destruction.

The district's wildlife habitat program of odd-area planting, fence and hedgerow planting, special food and cover areas, and selected site reservations is bringing wildlife back. Natural beauty is improved with every wildlife planting. Fruit and seed bearing plants, such as Christmas berry, quail brush, fire thorn, vetch, and millet, enhance the landscape while giving food and escape cover to small game and birds.

John Mensch, chairman, and the only remaining member of the original district board, says, "Soil conservation districts were new in California when the district was formed. In those days the organizing committee had a difficult job. Without Sam Tsukamoto, the district might never have been formed or progressed to its present stage."

Mr. Tsukamoto, who is quiet, but effective; soft spoken, yet out-spoken when necessary; and a devoted family man as well as a community leader has worked hard and faithfully to make soil and water conservation in his community a common interest of all the people.

In addition to serving as a director for the Florin District, he is a member of the California Farm Bureau, treasurer of Florin Athletic Club, auditor for the Florin Buddhist Church, and active in youth welfare work. ♦

Study to Predict Accurate Water Yields

Under a $57,076 research contract sponsored by USDA's Agricultural Research Service, scientists of the University of Georgia, Athens, will make a detailed 2½-year study of the influence of environment on floods and water yields in agricultural watersheds of the Southern Coastal Plains region.

Dr. Thomas H. Rogers, head of the University's Agronomy Department, will lead the project; John C. Stephens will represent ARS.

The purpose is first to examine flooding and water-yielding factors —geology, soils, slopes, plant cover, and drainage networks—of a 20.5-square-mile agricultural watershed in Turner County; analyze the characteristics by computer; determine the relationships between all elements affecting a watershed's hydrology; and then test the findings on a 145-square-mile agricultural watershed in Tift, Turner, and Worth counties.

Relationships between the elements under analysis also will be tested on a 3-square-mile urban site adjacent to the larger watershed; the smaller area will furnish a comparison between urban and agricultural land use conditions. ♦

Nematode Killer

Ordinary sugar mixed into soil acts as an effective killer of nematodes, the Agricultural Research Service has announced.

Rural Recreation for Profit. By Clodus R. Smith, Lloyd E. Partain, and James R. Champlin. *1966. Interstate Printers and Publishers, Inc., Danville, Ill. 303 pp., illus. $6.95.*

Rural Recreation for Profit is written for rural landowners and others concerned with income-producing recreation on rural lands. It is a practical guide for identifying, planning, developing, operating, and managing rural recreation enterprises.

Basic requirements, demand analysis, and the economic possibilities for different enterprises are discussed. Examples are used to show some ranges of investment and operating costs.

The book covers vacation farms and ranches, campgrounds, picnic and sports areas, fishing waters, hunting areas, shooting preserves, and scenic, historic, and nature areas. Sources of available information or guides on the different types of enterprises are given in the bibliography of each chapter.

Chapters are devoted to selecting, planning and developing, and merchandising rural recreation activities. Management, operation, and maintenance are discussed in a frank, forthright manner. The potential entrepreneur is advised to consider rural recreation as a business venture which demands careful planning, financing, and know-how.

Although written primarily for persons interested in rural recreation enterprises, the book will serve as a good reference source for resource conservation personnel, investment advisers, and others working with rural people on income-producing recreation.— Minott Silliman, Jr., *Resource Development Division, SCS, Washington, D. C.*

New Publications

Potomac Valley. Preliminary Report of the Recreation and Landscape Sub-Task Force of the Federal Interdepartmental Task Force on the Potomac. *1966. U. S. Dept. of the Interior. 80 pp., illus. (⅓ folio). $3.00.* This is the first of the reports from the four sub-task forces charged with spelling out the details of proposals for the President's plan to make the Potomac Basin "a model of scenic and recreational values," first revealed in broad outline in the *Potomac Interim Report to the President (Soil Conservation,* March 1966).

Like the interim report from the general task force, this one offers "information and suggestions," not final plans. Detailed drawings and charts, and lavish illustrations, provide a wealth of detail about the participating agencies' thinking, especially regarding the proposed Potomac Valley Park reaching from the river's mouth to Cumberland, Md.

The three other sub-task forces are on Soil Erosion and Sedimentation, Water Quality and Pollution Abatement, and Water Supply and Flood Control. The Secretary of the Interior is expected to make his final report to the President in January 1967.

Fish, Wildlife, and Pesticides. *1966. U. S. Dept. Interior. 12 pp., illus. $0.10.* Study of the spread of some pesticidal chemicals through the environments of humans and fish and wildlife and recommendations for their control.

"There has been no Silent Spring—yet. The frogs croak their love songs, the wild geese fly north on schedule, and the salmon splash their way upstream into the shallows to spawn. Perhaps Rachel Carson's widely read, widely praised, and sometimes denounced 'Silent Spring' helped to keep it from happening.

"It is reasonable and necessary to accept *controlled* use of chemicals for crop and livestock pests and for protection of human health from parasite-carrying animals.

"It is humane and proper to argue against pollution of our world and damage to the living resources—wild fish, birds, and mammals—we need and enjoy."—Foreword.

Pollution-Caused Fish Kills in 1965. *1966. U. S. Dept. Interior. 28 pp., illus. $0.25.*

Urban Sediment Can Be Controlled. *1966. 40 pp., illus. Interstate Commission on the Potomac River Basin Proceedings 1966–1, Winter Public Meeting, College Park, Md., February 17–18.* Contains papers on three panels: "The Role of Government and Industry in Sediment Control," "Managing the Land to Control Sediment," and "Interstate Interests." The papers discuss experiences and needs in curbing a major pollutant of the Potomac River and the streams that feed it.

Federal Programs for Individual and Community Advancement. *1966. USDA Agr. Hbk. 312. 53 pp.* Lists Federal programs that can aid residents of towns and small cities to create, in their localities, the same broad range of job opportunities, public services, and cultural facilities that are available to people in urban centers.

Equipment for Applying Soil Pesticides. By O. K. Hedden, J. D. Wilson, and J. P. Sleesman. *1966. USDA Agr. Hbk. 297. 37 pp., illus. $0.20.* Covers construction materials, applicators, methods for controlling application rates and cleaning the applicators, and gives selected references and a pesticide chemical key.

Year-Round Fun on Farm and Forest. *1966. USDA PA–720. Illus., folder.* Short descriptions of responsibilities of agencies in USDA for recreation and some of the publications on the subject (includes order blank).

Repair of Cracks in Concrete Channel Linings. By Robert J. Reginato and Lloyd E. Myers. *1966. USDA ARS 41–121. 8 pp.* Describes method for rapid repair of cracks by using commercial power equipment.

An Outline for Teaching Conservation in Elementary Schools. *1966. USDA PA–268. 14 pp.* A slight revision of the 1955 edition, bringing up to date the addresses of the State offices and completely updating the list of references.

Water Use

A survey of middle-income homes throughout the U. S. indicated that smaller amounts of water are used per person in the humid East than in other parts of the country. The amount used by each member of the family ranged from 27 to 75 gallons a day in the East to more than 200 gallons a day in the West. ♦

From the Administrator:

SCS Responsibility in Outdoor Recreation

CONSERVATION and wise use of soil, water, and related natural resources were never of greater importance than today. As competition for land becomes keener, choices between uses become more difficult for land owners and operators.

One of the growing demands on land and water resources is created by the vast interests in outdoor recreation. If the Nation's needs for recreation are to be met, much private land must be used, and owners must be able to earn reasonable returns on their investments.

Farmers and ranchers have been using some of their land and water for recreational purposes for many years in accordance with well-developed conservation plans.

In 1962 some degree of urgency was given to rural recreation by Congressional and administrative actions that broadened the responsibility of the Soil Conservation Service.

Recreation became an alternative use of land to be considered in the assistance made available to private land owners through soil and water conservation districts.

Accordingly, the Soil Conservation Service assumed a broader role in resource development and a new responsibility in its technical assistance program of soil and water conservation. The SCS technician, in his work with individual land owners and groups, now must consider many alternatives in the proper conservation and wise use of land, water, and related resources.

Some of these are:

(1) Suitability of available land and water for recreation.

(2) Technical help in planning appropriate use and treatment of land and water for various recreation enterprises and facilities.

(3) Appropriate economic information involved in the land and water-development processes.

In addition, SCS provides information, data, and research results that are important to land owners and operators and that will be helpful to them in making decisions. More important among these are:

(1) Information on sources of credit, cost-sharing, and other financial assistance.

(2) The need for competence in recreation enterprise management operations.

(3) The relation of the location of the resources to various recreation needs.

(4) Standard designs for recreation facilities.

Furthermore, SCS, in cooperation with soil conservation districts and other organizations, assists in conducting inventories of recreation facilities and potentials in order to provide information that will guide comprehensive recreation plans on a community, district, or area basis.

These new functions accentuate the importance of natural resource specialists' keeping abreast of the ever-broadening field of conservation and wise use of land and water. The resource conservation technician today should be qualified to advise on land and water treatment and practices used for outdoor recreation and many other purposes not thought of as conservation farming operations a few years ago.

A good conservation technician today consults with local planning, zoning, and regulatory authorities in the development of standards that will assure safe and healthful development of land and water for high-quality outdoor recreation to help meet the needs of the community, a nearby city, or urban population of distant places.

Under the broad leadership responsibility, he must be able to supply resource data and appropriate technical help in planning for use of the land and water and point out the limitations for various uses to the landowner.

He could not, however, be expected to provide all the information a landowner needs. He should point out to the landowner that even though conservation and wise use are basic to rural recreation success, other elements will be needed for a commercial operation—a peculiar kind of management, marketing, merchandising, and supervision of the enterprise.

He will urge the landowner going into the recreation business to obtain the best information available including the help of other specialists in developing a well-rounded commercial recreation enterprise.

The development of outdoor recreation is an important approach to rural areas development, improved rural living, and a broadened base for the rural economy in many areas of the country. The goal in outdoor recreation should be the bringing together of land, water, and people in appropriate harmony so that the welfare of all will be enhanced. In reaching that goal, however, it must be kept in mind that there are two primary functions of the Soil Conservation Service in recreation resource development:

(1) Technical assistance in land use for recreation purposes in accordance with Public Law 46, Public Law 566, and the Food and Agriculture Acts of 1962 and 1965.

(2) SCS leadership and liaison responsibility with other local, State, and Federal agencies and organizations in a position to assist in the development of recreation programs.

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POLK COUNTY SOIL CONSERVATION DISTRICT

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Soil Conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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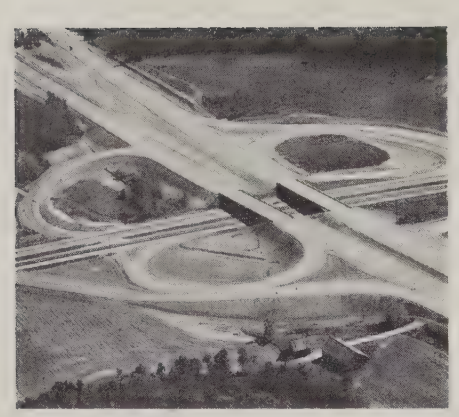
SOIL CONSERVATION SERVICE U. S. DEPARTMENT OF AGRICULTURE



Answers . . .

We have talked a good deal of late about the unexpected soil and water problems that vex builders and land owners in new urban areas.

But what can we answer when people ask, "What can we do about it?"

We have some of the answers in this issue of *Soil Conservation.* They come mostly from the nearby Washington metropolitan area, where construction is booming and where soil conservation districts have taken the initiative in offering counsel to developers moving into their territories.

Pioneers: Since early 1962 WUC Glenn Anderson has specialized in the problems associated with rapid urban development in the Northern Virginia SWC District.

We sent a staff writer to work with him in recording the story of the pioneering conservation work in Fairfax County (p. 75)—also the first county we know of to employ its own soil scientist.

Technology: The treatment of urban building sites is calling forth a new technology of soil stabilization and runoff control.

Marshall Augustine draws on his long experience in the metropolitan areas of Maryland and the Eastern Shore (p. 78) to tell how to use vegetation on critical areas.

"Augie's" conversation bubbles with new ideas about how to make plants grow in difficult sites. We'll be hearing more of them later.

COVER: An aerial view of a highway interchange in Prince Georges SWCD, Md., reveals the extent of exposed land surface needing stabilization in any major construction project.

Soil Conservation

Devoted to the wise use of land and water resources

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SOIL CONSERVATION is the official organ of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. The printing of this publication was approved by the Bureau of the Budget July 25, 1963.

ORVILLE L. FREEMAN — Secretary of Agriculture
JOHN A. BAKER — Assistant Secretary of Agriculture
DONALD A. WILLIAMS — Administrator, Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service,
U. S. Department of Agriculture, Washington, D. C. 20250

BEN O. OSBORN, Editor — GEORGIE A. KELLER, Production Editor

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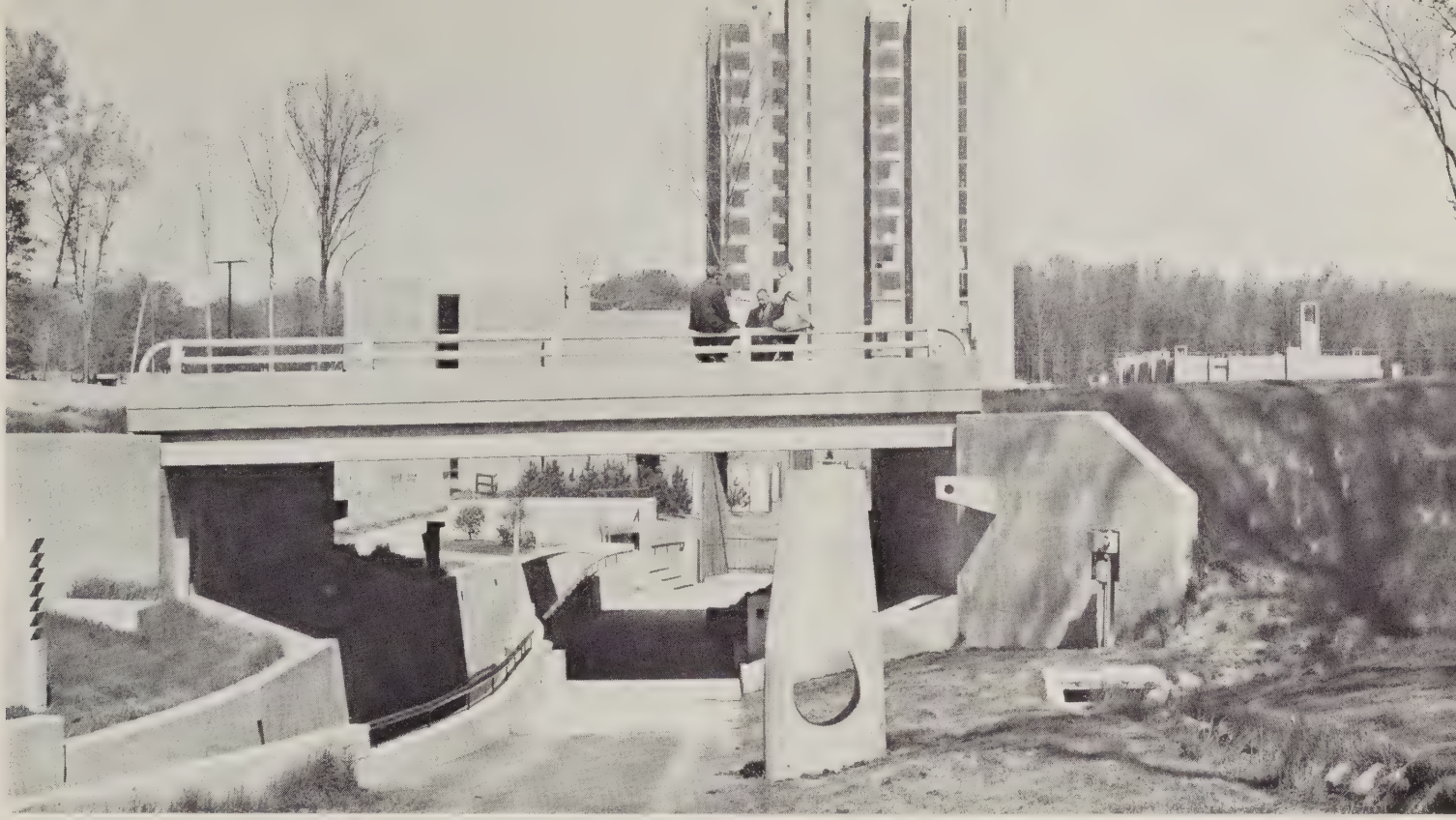


Reston . . . city with a conservation plan.

Conservation in New Urban Areas

By Glenn B. Anderson and Carolyn Johnston
Work Unit Conservationist, SCS, Fairfax, Va., and Information Specialist, SCS, Washington, D. C.

EXPERIENCE, public opinion, and time—these are the forces that unite builders, public officials, and citizens in the practice of soil and water conservation in a rapidly developing suburban area.

The conservation outlook has changed strikingly in Fairfax County, Va., in the 5 years since the soil conservation district took the initiative in dealing with the problems of land changing from farm to nonfarm uses.

Fairfax County is part of the Washington, D. C., metropolitan area and is currently experiencing the full impact of massive urbanization. About 30 percent of its area is already built up, and 35 percent is in the process of development.

Supervisors of the Northern Virginia Soil and Water Conservation District (which includes Fairfax County) watched with dismay as major areas were damaged almost beyond recognition by erosion of building sites and the resulting flooding and sedimentation of lower-lying areas.

At the district's request, SCS assigned a soil conservationist to work full time on urbanization problems. The district announced its new program by distributing 500 leaflets on the need for erosion control. Personal letters to 265 bonded builders requested their cooperation and offered help, without charge, in conservation planning.

Only six builders acknowledged the letter. None requested assistance.

Today the soil conservationist has a backlog of requests that fills his schedule several weeks in advance.

And the county board of supervisors has just approved a major overhaul of its zoning ordinances that tightens the requirements for soil and water conservation.

Response to public demand

Under the revised regulations, which apply to all public construction work, builders and developers must (1) have conservation plans approved by the county in their zoning request, and (2) put up bond and cash in escrow as enforcement guarantees.

The new regulations came from recommendations of a special subcommittee of the Fairfax County

Planning Commission. The commission is also currently revising its master plan, with emphasis on watershed protection and flood prevention. To date, preliminary studies have been made on six watersheds, and SCS assistance under Public Law 566 has been approved for one of them, the Pohick Creek watershed.

A conservation program in a developing urban area could never get off the ground—or, more literally, on the ground—without the backing of public officials. Such backing, in turn, depends on the interest and initiative of local citizens.

Many civic groups have supported the program in Fairfax County, but perhaps none was more influential than the League of Women Voters. That organization was extremely effective in reaching more than a hundred other county associations that helped marshal public support for the zoning ordinances and building regulations.

Without strong public support, builders and developers may initially show little concern for conservation measures. After some experience with conservation versus nonconservation methods, however, the benefits of erosion control are convincing. Requests for help from builders *before* an emergency have gone steadily upward in the past few years.

A few case histories will illustrate some of the problems and the progress experienced in conservation work on land being converted to urban uses in Fairfax County.

The general conservation plan map of Tysons Corner International Shopping Center, prepared before earthmoving started, shows principal measures to prevent sediment from leaving the site during construction and to stabilize the final land surface. They are (1) two large debris basins at the foot of the slope, (2) two underground drains with surface inlets to collect runoff and seepage water and to serve as outlets for the debris basins, (3) temporary vegetation to be established as needed after rough grading, and (4) permanent vegetation to be established after final drainage.

City in the country

Reston, a "new town" in a rural setting already attracting national attention for the completeness of its planning, is the largest development in Fairfax County.

Its developers were among the first to request the district's assistance. After building a 35-acre lake, planned with SCS technical assistance, as a focal point for the new business and residential area, Reston developers went on to establish a number of other conservation measures.

They include: (1) A nursery to save thousands of plants that would otherwise be destroyed during construction; (2) planting some 30,000 tree seedlings on abandoned and eroded farmland; (3) an excellent water-disposal system ranging from elaborate storm sewers to simple grassed waterways; (4) bridle and fire trails with conservation features; (5) a comprehensive plan for the management of forest lands (Reston has a professional forester on its staff); (6) an elaborate irrigation system for the area; (7) nature centers, and the improvement of wildlife habitat by planting special food and cover plants; and (8) a continuing lake management program.

The result is both excellent land use and a strikingly beautiful mixture of urban buildings and rural landscape. The beauty will last, thanks to careful conservation planning from the beginning.

A shopping center

The largest commercial development in Fairfax County, when completed, will be Tysons Corner International Shopping Center. The 86-acre site had a range in elevation of 125 feet and some of the most erodible soils in the county.

The conservation plan for Tysons Corner was made prior to

A drainage ditch at Reston leading into Lake Anne is lined with concrete and rock. The surrounding area is sodded.

issuance of a grading permit by Fairfax County. The plan includes two temporary debris basins, constructed before major land grading began, to trap silt-laden runoff. They can store more than 4 inches of sediment from each acre of disturbed land and will be supported by diversion terraces and temporary and permanent vegetation. An underground drainage system, consisting of 18-inch perforated pipe with gravel-filled surface inlets at strategic points to collect runoff water, also was installed at the beginning of work on the project.

Sand and gravel mining

Sand and gravel mining is a major industry in Fairfax County. At one time, hundreds of abandoned gravel pits scarred the countryside.

In 1962, Fairfax County passed an ordinance requiring mine owners to rehabilitate gravel pits after they were exhausted. Companies were required to have an approved conservation plan and to post a bond of $1,000 or more an acre assuring that it would be followed before a zoning permit would be granted.

In the first 2 years, more than 600 acres of critical mined areas were restored.

Conservation measures used include debris basins, stockpiling of topsoil, careful grading of the entire area to conform to the natural lay of the land, replacing topsoil, and reseeding.

Individual homes

Miss Rebecca Dial, a retired school teacher, has lived in her attractive home for 17 years. A little creek, bordered by trees and shrubs, flows through her well-kept backyard, which she makes available for Sunday school outings.

To accommodate heavier runoff due to land changes upstream, Fairfax County officials proposed to take out the trees and shrubs and change the pleasant little creek into a shallow 30-foot-wide concrete-lined ditch.

Miss Dial objected. So did her close neighbors. They asked the Northern Virginia Conservation District for ideas on a waterway that would meet the drainage needs, yet still be attractive.

After considerable discussion the county decided to use a new plan for a 10-foot-wide creek with banks stabilized by concrete rubble.

Results? The necessary drainage was accomplished at less expense to the county for materials and use of equipment, and the neighborhood remains a beautiful area.

One landowner in the city of Falls Church had 15 acres of land worth at least $60,000 an acre. It was bordered by major highways and surrounded by luxury homes.

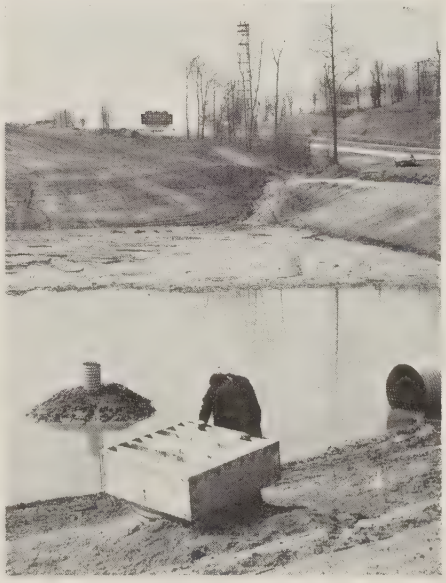
The soil itself was rocky and nonarable, much of it fill material from other excavations. It had no vegetation and was used as a dumping ground for trash. Nearby homeowners and apartment dwellers objected to the dust and unsightly view, but nothing was done.

Then a heavy rain washed large quantities of the denuded soil into nearby areas, clogging the streets and sewers. Firehoses were forced into the drains, but the silt was too compacted to budge. The city finally had to buy a special cleaning machine to open the drains.

Angry city officials were ready to sue for damages. The worried lot owner contacted the district

(Continued on p. 90)

A surface inlet (left), filled with gravel as a filter, collects water at the upper edge of the building site and conveys it to the underground drainage system at Tysons Corner Shopping Center. The author notes debris deposited by the water. At right, conservationist examines the brush guard on the outlet of one of the debris basins. Beyond is the trickle-tube that joins the same outlet connecting with the underground drainage system for the building site.



A planting of highbush cranberry, silky cornell, and redosier dogwood next to an overpass on an interstate highway eliminates the necessity of mowing in a difficult and hazardous location.

Using Vegetation to Stabilize Critical Areas in Building Sites

By Marshall T. Augustine, *Soil Conservationist, SCS, College Park, Md.*

DURING the past 200 years, Americans have changed the face of this country at a speed unequaled by any other nation. In doing so, we have created extensive and complex erosion, land use, and siltation problems.

Today, the development and use of powerful earthmoving equipment has made it possible to literally move mountains, create canyon-like cuts, and produce extensive fill areas.

This power, coupled with the demands of our exploding population and our economic prosperity, is bringing about, in many parts of the country, the rapid conversion of farms and woodlands to highways, industrial and shopping centers, subdivisions, and other urban uses.

Because land values are high, many urban developers feel obliged to strive for the most intensive land use possible.

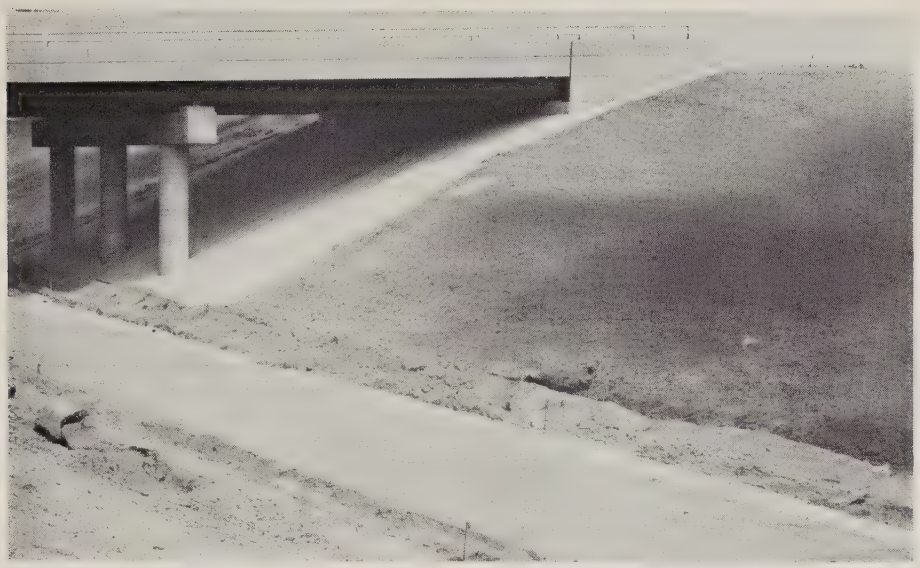
All too often, the extensive grading operations for the installation of buildings, parking lots, roads, and the like are conducted with little thought to the resulting cut and fill slopes. These are areas which the conservationist must somehow stabilize.

A first step should be adequate planning and zoning ordinances providing conservation for rapidly developing areas. Then, the soil scientist, engineer, conservationist, and often the geologist must work together as a team from the planning stages through construction to provide the developer with necessary information to attain an acceptable degree of erosion control through vegetative practices.

Veteran conservationists will note several major differences between agricultural conservation work and work in areas of rapidly changing land use. These include:

(1) *Finality.*—Agricultural con-

A roadcut is stabilized by planting grass to the height of one mower swath above the ditch line and letting a voluntary growth of low shrubs cover the rest of the slope—in this case, honeysuckle and sumac. The entire slope was fertilized to stimulate the growth of natural vegetation where grass was not planted.



Temporary stabilization of cuts and fills is provided by straw mulch held in place by asphalt, both sprayed on with large machinery. Permanent vegetation is to be planted after construction and grading are completed.

servation planning and application allow flexibility in many practices. For example, a contour stripped field of corn, small grain, and hay could probably be converted to pasture, hay, woodland, or even to recreational use and still be within the capabilities of the soil.

On the contrary, once roads, parking lots, buildings, and utility lines are laid out and built, there is little chance of changing the land use, even if it is found not to be within the normal capability of the soil.

(2) *People.*—In farm and ranch planning, the conservationist works with a land owner or operator who is usually familiar with conservation programs, practices, and terminology. These same people, with the help of the conservationist, will apply the practices agreed upon.

In developing urban areas, the conservation or natural resource planning may be done by a single lot owner, a planning and zoning commission or department of public works representative, a home developer, or others. All these people are highly skilled in their fields but seldom conversant with conservation technology. To add another complication, the application of conservation practices is often contracted out to still other specialists.

(3) *Economics.*—The conservationist, in planning and applying conservation practices in areas of rapid land use change, is dealing with "big money." An acre in a subdivision usually has a dollar value many times that of an acre in agriculture. Conservation practices used when that acre was in agriculture may still be valid when it becomes a part of a subdivision, but these practices may be more difficult to plan and apply and should be rated in proportion to the value of the property protected.

Probably the most troublesome nonfarm erosion occurs on cuts and fills. Unfortunately, there are no hard and fast rules that govern slope stabilization. But we do know that a vegetated slope will inevitably break down if the soil itself is unstable, if it is subject to excessive overland flow or subsurface seepage, if the angle or length of slope is excessive, or if toxic materials are present.

Provided these difficulties are not present, the major limiting factor to stabilization becomes the moisture-holding capacity of the soil. If the silt-clay content is 25 percent or less, the soil's moisture-holding capacity is severely limited, especially on southern exposures.

Blanketing such slopes with a layer of soil containing 35 percent or more of clay and silt particles will dramatically increase the moisture-holding capacity and provide more vigorous plant growth. This material does not have to be topsoil.

A finely prepared slope seedbed is often a prime target for sheet and rill erosion, especially if there is a prolonged time before seeding. One preventive measure is to roughen the slope face before placing the topsoil. This practice is especially beneficial in bonding the topsoil with a compacted shale or slowly permeable clay soil.

If there is to be a time lapse between seedbed preparation and seeding, then work lime into the top 3 inches of soil, being careful not to prepare too fine a seedbed, and stabilize with a mulch-anchoring tool or with asphalt. The seed and fertilizer then can be applied in season over a protectively mulched surface in a hydraulic slurry.

Good clean straw mulch applied at the rate of 1½ to 2 tons an acre and anchored on a well-prepared seedbed probably provides the best erosion control.

New equipment and techniques are advancing the art of seedbed preparation, liming, fertilizing, seeding, mulching, and mulch anchoring, but we still need a wider range of better adapted plant materials.

From Canada to Florida, Kentucky 31 tall fescue is the old standby for slope stabilization, but it tends to thin out and become clumpy where intensive fertilization and management are not maintained. Its life span can be materially prolonged by working a generous application of superphosphate in with the lime.

Kentucky 31 tall fescue prefers cool slopes but will tolerate droughty to poorly drained soils.

The inside face of a watershed dam in the Rock Creek watershed, Maryland, is protected by Kentucky 31 fescue. The drainage channel formed by the angle of the dam with the original valley slope was stabilized before seeding by baffles of porous fiberglass matting and a jute lining.

It is hoped that SCS plant materials centers will soon be able to furnish us with a more rhizomatous tall fescue.

Sericea lespedeza makes an excellent companion legume for tall fescue, especially on heavy clay or sandy warm slopes. It is well adapted to the middle latitudes of the Eastern United States.

Due to its tall growth and winter dormancy, sericea may present a fire hazard. Several low-growing, prostrate lespedezas that avoid this problem are under observation at the National Plant Materials Center at Beltsville, Md.

Birdsfoot trefoil is a good long-lived companion for tall fescue at elevations of more than 2,000 feet in the northern half of the United States.

Reed canarygrass is still the best grass for stabilizing seepage areas. It also tolerates droughty slope conditions. Its tall vigorous growth limits its usage, but new low-growing strains are under observation.

Crownvetch, a long-lived fast-spreading legume, persists where adapted, with very little maintenance in the northern two-thirds of the country. It will grow on coarse-, medium-, and fine-textured soils. It grows best in limestone areas.

Currently more use is being made of warm-season grasses for critical area stabilization. Tufcote bermudagrass, released by the National Plant Materials Center and the University of Maryland, is a hardy warm-season grass that spreads rapidly even under difficult soil conditions. It is established by sprigs, plugs, or sods.

Tufcote is resistant to traffic, salt spray, and drought. It is long-lived but, like all bermudagrass, should be fertilized annually. Its range extends from the deep South through the Coastal Plain and Piedmont regions as far north as Delaware.

In some cases, it is impossible to have an acceptable silt-clay content with the moisture retention needed for cool-season grasses. The hydraulic fills in tidewater areas, with their heterogenous mixtures of sand, gravel, and silt, and cuts and fills in deep Coastal Plain sands, are cases in point. Here, tall-growing warm-season grasses, such as weeping lovegrass or American beachgrass, can be used to stabilize the areas.

Weeping lovegrass provides a better and longer lived erosion-control cover if seeded with sericea lespedeza and if adequately limed and fertilized. It will not tolerate sand deposition.

American beachgrass is now available at commercial nurseries along the east coast. If planted on an 18- by 42-inch spacing and fertilized at the time of planting with deep-placed controlled-release fertilizer, it will produce an erosion-control cover in less than one growing season. No mulch or lime is required, and no topdressing for 3 to 5 years. It thrives on sand deposition.

The high maintenance cost of grasses and legumes is causing increasing demands for other ground covers, such as shrubs, for slope stabilization, particularly above the mowline on highway slopes and interchanges. These plants are more difficult and expensive to establish, but once established they provide a long-lived low-maintenance cover.

Plants on a variety of low-fertility soils, ranging from sand and gravel to clay, showed excellent growth when controlled-release magnesium ammonium phosphate fertilizer was used. The fertilizer was placed in the bottom of the planting hole at the time of planting.

In mass slope plantings in the past, specimen-size plants have had to be used to secure adequate survival. With improved stock, fertilizers, mulching materials, and techniques, young planting stock can be used at a substantial savings.

The field of stabilizing critical areas with vegetation is relatively new. It is a challenging and dynamic field. ♦

A giant step forward . . .

Urban Sediment-Control Program Adopted by Maryland County

By Edward R. Keil
State Conservationist, SCS, College Park, Md.

TAKING direct action to curb the increasing menace of sediment damage to high-value watersheds in the Washington, D. C., area, nearby Montgomery County, Md., officials and soil conservation leaders have recently adopted a sediment-control program cited by local leaders as "the first giant step toward a new era of urban conservation." The program has the enthusiastic backing of local building contractors.

Five major practices to relieve a sediment rate that runs as high as 2,300 tons per square mile annually in some Potomac River subwatersheds were worked out cooperatively by Soil Conservation Service officials, the Montgomery County Soil Conservation District, the County Council, the Maryland National Capital Park and Planning Commission, the Washington Suburban Sanitary Commission, the Suburban Maryland Builders Association, and the Montgomery Home Builders Association.

New construction procedures include: As brief as practical exposure of scalped soil; quick seeding, or other means of replacing plant cover; saving as much natural vegetation as possible; construction development in harmony with natural topography and drainage patterns in larger projects; and the installation of temporary sediment basins where other measures do not achieve controls.

Technical conservation guide sheets for contractors have been issued to 1,200 members of the Suburban Maryland Home Builders Association (SMHBA) by Colonel Robert E. Brennan, executive director. The Suburban Home Builders made housing construction starts valued at $97 million during 1964 in Montgomery County alone, and all evidence points toward continued heavy building. Montgomery County is a 500 square-mile area abutting the District of Columbia.

A task force to develop plans for sediment control in the county was organized 2 years ago. Specifications for the program were derived from a quarter-century of experience in land management gained by landowners in the county's rolling, highly erosive Piedmont soil.

The legal authority for the program came from the standard reference for developers, "Subdivision Regulations of the Maryland-Washington Regional District." The program relies upon existing agencies for implementation and is flexible enough to fit the physical variations in the county and other technical considerations.

Program procedures for developers and participating agencies are:

Preapplication stage.—The developer and his engineers receive consultive assistance from county agencies and the soil conservation district. The developer becomes a district cooperator and receives soils information and guide standards for erosion-control measures.

Preliminary subdivision plan stage.—The developer submits his plans to the Park and Planning Commission. Along with other necessary reviews, the plans having significant erosion potential are referred to the soil conservation district for a check of erosion-

An SCS technician checks the depth of silt washed from the bare ground above. Disturbed land, left unprotected, sends tons of silt into streams below. Proper conservation measures can reduce this problem.

A 25-year-old spruce, just removed from the ground, is wrapped in burlap to be transported to a nursery temporarily and later replanted in a housing development.

control plans. The district furnishes technical assistance in planning satisfactory sediment-control measures.

Recording stage.—The required erosion-control practices are incorporated in the public works improvement agreement which must be completed before the subdivision plat is recorded.

Construction permit stage.—The Department of Public Works reviews the application for conformance with sediment control and other provisions of the approved preliminary subdivision plans.

Construction stage.—The soil conservation district furnishes consultive technical assistance to the developer and his engineer in establishing the planned sediment-control measures.

Compliance.—The Department of Public Works enforces compliances with the plans.

SCS technical aid, furnished through the Montgomery Soil Conservation District supervisors, has helped speed results and gain the builders' acceptance of conservation help. SCS aid includes onsite soil information, water-runoff surveys, the design of erosion-control structures, and advice on special vegetation.

Early benefit

One early benefit from these activities was Federal approval for a $1½ million flood-prevention and recreation lake located near the center of Montgomery County's half-million population. The lake is part of the Rock Creek Watershed Project, which had been halted for a time because of the threat of uncontrolled sediment.

The Maryland building developers' experiences with soil- and water-saving techniques have resulted in improved conservation methods and a better knowledge of costs and returns. Officials cite an average of $20 to $30 in conservation expenditures for a 100- by 100-foot lot.

Land operators already embarked on the new approach can cite many advantages to offset expenses. William Hurley, project director for a 2,100-acre, self-contained village planned for the county, offered SMHBA his findings as an example.

Hurley said the village, planned as a 20-year development, will eventually house 12,000 families. Although $235,000 will be spent on conservation measures, including 40 sediment basins, he expects benefits to exceed costs.

Two lakes on the development will help trap excess silt during the building period. These will be used later for recreational purposes. Large areas of open spaces and parkland will be planted to trees, to help enhance the village atmosphere. A number of the sediment basins will eventually become water hazards for an 18-hole golf course.

"Best of all," adds Hurley, "as we go along, we don't have to work up to our knees in mud. We get continuous access for year-round selling. Already we find buyers sense the 'countryfied' touch and are willing to pay the freight for it."

Encouraged by the progress to date, Maryland builders have organized their own sediment-control committee, chairmanned by James O'Mara, a consulting engineer. The group aims to help develop conservation technology as applied to urban construction, study related economics, and assist in pertinent legislation.

Principles of success

To keep the Montgomery County's Sediment-Control Program on course, a steering committee selected from the original task force meets annually. Progress is checked and new directions given as needed, to insure steady improvement in techniques, design, and the economics of installation. The building industry continues its participation.

Basic to the success of a sediment-control program like this are several important elements:

(1) All affected groups should participate. This has been a cardinal principle with SCS in carrying out its national soil and water conservation program. And it works!

(2) Sediment control should be a stated policy of local government and all other concerned agencies in the county. Without this, support is unofficial and half-hearted.

(3) An effective public relations program is necessary to get public and industry support.

(4) Competent technical personnel and workable procedures and enforcement are essential. Broad participation in the work makes this more easily attainable.

(5) Sediment control must be incorporated in the planning stage of subdivision development for most effective application during construction. The "plan your work and work your plan" principle applies here.

(6) Accepted technical principles must be used and skillfully applied to provide significant sediment reductions.

(7) Research and periodic evaluations should be provided for, to bring needed improvements and up-dating to the program.

Although Montgomery County's Sediment-Control Program is still in its early stages and some problems have arisen, all agencies and groups are cooperating well. Considerable amounts of sediment are still going into the dams and into the Potomac River from the rest of the county, but we are confident that this program will result in significant reductions at reasonable cost. ♦

Soil Conservation to Schools

The Steward Soil Conservation District in Tennessee sends complimentary subscriptions of *Soil Conservation* Magazine to each high school library and vocational agriculture department in the county. ♦

Stoplight Code for Soil Maps Aids County Land Use Planning

By Robert H. Montgomery
Soil Scientist, SCS, Batavia, Ill.

THE GLOW of colored soil interpretation maps warns of limitations or signals "full speed ahead" for proposed uses of land in McHenry County, Ill.

Land capability classes indicated by color on aerial photos have aided the planning of agricultural land for many years. But McHenry County Soil and Water Conservation District officials are now using colors to discourage improper nonfarm uses of land. Homes, factories, roads, parks, and other installations have soil related problems.

In their interpretations, green (as a go sign) is used to indicate few or only slight limitations for a potential use. Yellow (caution) indicates a moderate limitation—problems which can be economically overcome. Red (stop) shows severe limitations. Red does not mean that the soil cannot be used for a specific purpose but rather that problems are severe and may not be economically feasible to correct.

McHenry County, located 35 miles northwest of Chicago, is still predominantly rural. However, it is an integral part of the rapidly growing Chicago metropolitan area, and nonfarm uses of land are increasing rapidly. The cooperative soil survey of the county, a joint undertaking of the Soil Conservation Service and the University of Illinois, was published in 1965.

The McHenry County District began using the new soil survey information with their farmer cooperators as rapidly as it was mapped. But the supervisors knew they were not reaching the rapidly increasing number of people involved in nonagricultural uses of land.

In 1963, members of the board learned of work being done in Ela Township in Lake County, Ill., where officials were pioneering in using colored interpretations of soil maps to guide urban development. Soon after McHenry County created a planning commission, the conservation district offered to assist by providing soils information as a part of the planning inventory.

As a beginning, the Soil Conservation Service provided the needed interpretations. Four interpretations were made: (1) Agricultural limitations, (2) septic tank disposal field limitations, (3) building foundation limitations, and (4) flooding potential.

The county hired a girl to color maps as indicated by SCS interpretations and appropriated money for map reproduction.

The planning commission has developed a mylar base map of each township of the same 4-inch-per-mile scale as the soil interpretive maps. When the base map is placed over the interpretive map, it is easy to see the degree of soil limitations for a specific use.

One of the most important functions of these maps is to furnish factual information to the zoning board as a basis for making zoning decisions. The soil maps are also effective in the planning or preventive approach to flooding and sanitation problems. The information is presented in such clear, readily interpreted manner that it has become an everyday working tool for land use decision makers in McHenry County. ♦

The author takes no credit for the development of the stoplight approach to land use planning. It has evolved through the efforts of many people during the past 5 years.

For Conservation Benefits . .

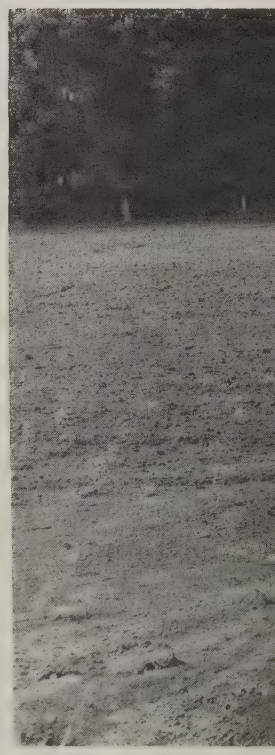
We Give Thanks

THE FIRST Thanksgiving was celebrated by men and women who survived largely because friendly Indians taught them how to use a strange land wisely. Since then, American agriculture has gone from survival to opulent abundance. Today, Americans are among the world's best-fed people even though we spend only about 18 percent of our income on food.

All over the Nation, young mothers like Mrs. Adrian Achtermann of Millersburg, Ohio, (right), find the produce of the earth is plentiful with which to feed her family.

This Thanksgiving, millions of families, like the Robert Wachtel family of Millersburg (far right) will bow their heads and thank God for the bountiful soil that, when well and properly tilled, provides us with the food that is the basis of life.

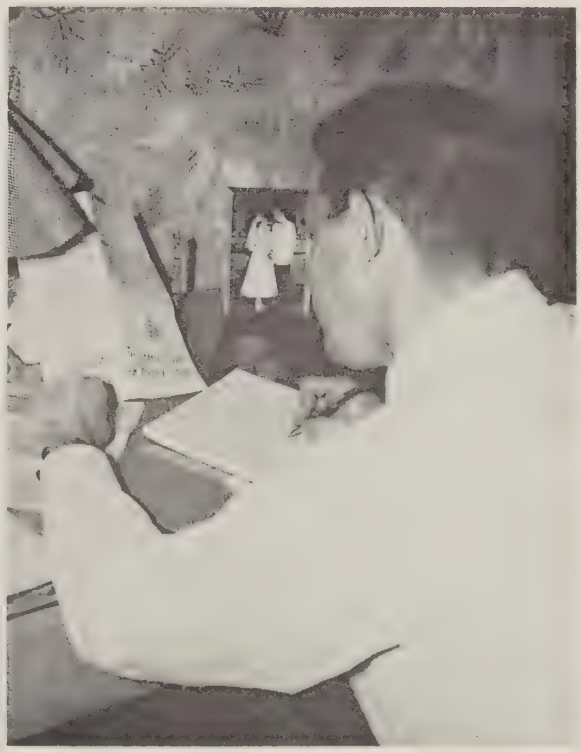
Good soil stewardship is seen on this Amish farm (below) near Berlin, Ohio. Note the contour strips. Only a few miles away, another farm (right) shows the havoc of sheet erosion caused by a 1-½-inch rain on unprotected land. Such loss affects not only the present owners but future generations also.



Above—"Let us give thanks for this abundant food that is provided by proper tillage of the land. Let us ever be mindful that we can eat balanced diets because of the foresight of our many conservation farmers. May we continue to give our praise to the Almighty God for instilling within farmers the desire to farm the conservation way for the benefit of all mankind."

Tax dollars are used to help in aiding conservation work on the farms of America. Below, Robert Wachtel works on his income tax form.

These pictures by Adrian Achtermann, SCS work unit conservationist, Millersburg, Ohio, won the recent Oliver Photo Award for Ohio.



Conservation Clinic Qualifies Boy Scouts for Merit Badges

By Charles H. Williams, Jr., and Justus V. Baum, Jr.
District Scout Executive, B.S.A., and Work Unit Conservationist, SCS, Williamsport, Pa.

A 1-day, conservation clinic at Camp Kline near Williamsport, Pa., culminated a series of separate workshops and local projects last spring for Boy Scouts and Explorers working on conservation merit badges in the West Branch Council.

Specialists of the Soil Conservation Service, Pennsylvania Department of Forests and Waters, and Pennsylvania Game Commission joined in supervising 150 boys in a day of work on the campgrounds and testing their knowledge of conservation subjects. The merit badge certificates were given at an award ceremony following the field activities.

In the month preceding the clinic each agency had instructed the boys working to qualify for merit badges in soil and water conservation, forestry, and wildlife management.

Soil Conservation Service employees at Williamsport had conducted three evening workshops for a hundred boys studying soil and water conservation. They used motion pictures, charts, publications, and discussions to explain the subjects, "Learning the Land," "How to Use the Land," and "Water and You."

The boys performed individual work projects to meet the merit badge requirements, following a workbook prepared by the district Scout executive and the SCS work unit conservationist.

Similar courses were conducted by the other agencies in forestry and wildlife management. This was the second year for the cooperative training program for the Scouts and Explorers.

A week before the clinic itself, officials of the Boy Scout council and the SCS visited the camp and laid out the work to be done according to the conservation plan previously developed in cooperation with Lycoming County Soil and Water Conservation District. Projects planned were transplanting of trees from the nursery to troop campsites, planting of 5,000 tree seedlings in a new tree nursery site, planting of shrubs for wildlife, shaping side slopes, fertilizing and planting of grass seed on a drainage ditch and the waterfront swimming area, and planting of basket willow for streambank erosion control and a multiflora rose living fence.

On the day of the clinic, the Scouts and Explorers reported to the camp early, dressed in work clothes and equipped with buckets and shovels. They were met by men from the conservation agencies and assigned to work groups according to the merit badges they were working on. One group worked on the drainage ditch and waterfront area, another group transplanted trees, a third planted seedlings in the new nursery, and a fourth planted multiflora roses for wildlife cover.

Following lunch, the groups exchanged projects. The experience not only gave the boys a better understanding of conservation but also made good progress in installing planned conservation practices on the camp.

Camp Kline is one of the oldest Scout camps in the Nation, dating back to 1920, when James N. Kline, a Williamsport businessman, bought a 360-acre farm and donated it to the local council for a camp. The land included 160 acres of flat land then being farmed and 200 acres of mountain land.

Meantime, many trees have been planted and the camp has one of the finest arboretums in the State.

Scouts working for Soil and Water Conservation Merit Badge dig young trees from nursery for transplanting to campsites.

The authors, Charles Williams (left) and Justus Baum, plan the rotation of campsites as a part of the conservation program on Camp Kline.

The conservation plan calls for completing the reforestation of the 100 acres of flat land and converting it to suitable troop campsites, the planting of ground cover on recreation areas, and the completion and seeding of a drainage ditch to divert mountain runoff from the campsites. ♦

Chemicals Clean Muddy Water for Storage

Inexpensive, easy-to-apply chemicals can clean muddy surface water and make it fit to pump down into the water table, reports Victor L. Hauser of the Agricultural Research Service.

In areas, such as the Southern High Plains of New Mexico, Oklahoma, and Texas, water collects in undrained basins called playas. Soils in the playa floors are virtually impermeable, and almost all the water that collects there is lost to evaporation.

For some time scientists have been experimenting with wells to pump this water into the ground where it can be stored for later use. Muddiness of the water has been a major obstacle; sediment quickly plugs up the wells. Filtering systems prove difficult to clean and operate.

A mixture of alum and cationic polyelectrolyte added to the water reduces the sediment content by 90 percent. ♦

Michigan Town Saves Money From Many Uses of Soils Information

By Martin E. Kangas and Robert W. Johnson
Work Unit Conservationist and Soil Scientist, SCS, East Lansing, Mich.

GOOD SOILS information sliced more than $60,000 off the cost of a new high school in Ontonagon, Mich. As an added result, Ontonagon industries, home builders, and county planners are now also making widespread use of soil surveys.

The Michigan community of 3,400 people began to plan a new high school after the adjoining school districts of Rockland and Mass were merged with it. The logical site seemed to be an area close to the old high school.

However, some community leaders felt they wanted basic soils information before additional land was purchased. So the school board asked the Ontonagon Soil Conservation District for soil maps and interpretations on three potential sites.

Soil Conservation Service in cooperation with the Michigan Agricultural Experiment Station prepared maps and interpretations for the areas showing such items as soil texture, permeability of the soil layers, and depth of soil to the water table. They also provided an evaluation report on soil limitations affecting building foundations, frost action, winter grading, and any development of playground and sport areas.

The SCS soils study was presented to the Ontonagon school board, the consulting architects, and other interested persons. The architects used the report when preparing cost estimates for each site.

When the cost estimates were submitted, the school board was startled to discover that construction on their first choice location would cost $60,000 more than on the closest alternative. Soil-related problems were the major reason.

For example, the construction of the athletic field on the preferred site would be $30,000 more expensive than on the second site. Extra excavation costs of $16,000 for the building would also have occurred because of shale near the surface. Wet plastic clays overlying the soft shale was another cost-increasing factor.

By contrast, the best alternate site consisted primarily of deep-, well-, and moderately well-drained sands with areas of deep wet sands. Some drainage was needed in both sites. The alternate site was primarily in woodland with a variety of woody and herbaceous species. Since the school board planned to develop an outdoor laboratory for nature study at the new school, this was an important factor to consider.

Citizens vote on site

As discussion of the various sites went on, the school board decided that voters themselves should have a choice in deciding. It was, after all, their money being spent.

A referendum was called. The public was presented with the facts on various site selections. They voted overwhelmingly in favor of the alternate, wooded, less expensive site. The school board agreed, and all factions of the community gave their support to the now-most-popular choice.

Later, a bond issue of $2,150,000 was passed by the voters, by a 2 to 1 margin.

Miles Plutchak, president of the

Ontonagon School Board comments:

"The soils and site information provided by the Soil Conservation Service was invaluable to the school board in directing our new building program to a successful conclusion. It gave the public sound, unbiased information necessary in this kind of public project."

SCS help continues

As school construction began, SCS continued to play an important role. It provided help in planning the location of school buildings, parking areas, and roads. It also helped with the drainage arrangements and plans for the establishment of an outdoor nature study area.

It is the opinion of the consulting architects that the technical assistance and information provided by SCS in site selection and development, drainage, and land use not only saved the community tens of thousands of dollars but also gave the architects the local information and assistance needed to design the type of educational plant the community needs and can afford.

Ontonagons are looking forward to their new high school, confident they have chosen wisely in their site-selection plans. The experience has resulted in wider use of scientific soils information by many other groups in the community.

A "prestige" residential subdivision called Country Club Estates has used soil maps and interpretations extensively in its development plans. The Ontonagon Historical Society requested detailed information before it chose a site for a new museum building. Similar information was provided by SCS in the plans for a new community hospital and Medicare facility. Picnic sites, roads, and parking sites are a few other areas where Ontonagon officials are using SCS technical information.

And still more uses

A 40-unit senior housing development in Ontonagon also benefited from soils information. Three sites were investigated and abandoned because of poor soil conditions before a suitable area was found.

Warren Millard, Ontonagon village engineer comments, "The Housing Commission saved more than $7,000 in fill material alone by selecting an alternate site for its buildings." He pointed out that, by having information available early in the planning stages, it was easy to select a new site.

Industry, too, is calling for soils information. The White Pine Copper Company used SCS assistance to help control erosion in their mine-refuse area. Some of the earthfills are more than 90 feet high and up to 5 miles long.

The value of soil and water conservation assistance in Ontonagon County might be summed up by the comment of Robert Mazurek, chairman of the County Board of Supervisors:

"Soil conservation districts are now providing rural communities like ours with the kind of assistance and technical information we have needed but have been unable to obtain, much less afford." ♦

School officials study the site plan for Ontonagon School, based on soils information provided by the Soil Conservation Service. Left to right: James Webber, principal; Francis Zimmer, site committee chairman; and Victor Keefer, superintendent.

REA Loans Benefit Consumers

More than 6,150 new rural consumers in 9 States, as well as existing consumers, will benefit from $7,849,000 in loans approved by the Rural Electrification Administration. Loan funds will finance construction of 577 miles of distribution lines and 135 miles of transmission lines and provide related system improvements.

Borrowers are in Alabama, Arizona, Michigan, Missouri, Nebraska, Oklahoma, South Carolina, South Dakota, and Virginia. ♦

Reports on Farm Products

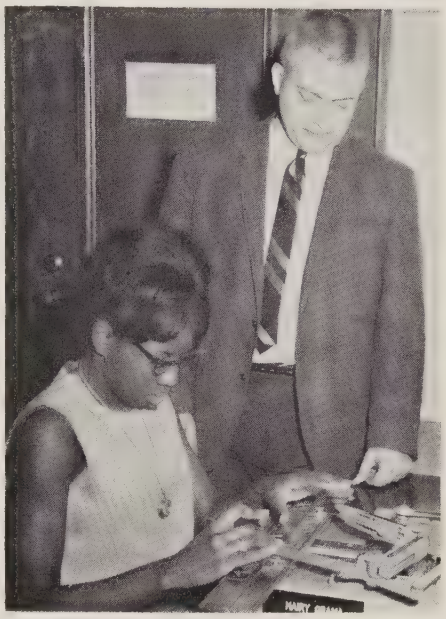
To supply the need for agricultural statistics, some 700 reports are issued in Washington each year and hundreds more in the States for nearly 200 farm products. ♦

Youth Corps Project Gives Conservation Training

"OUR DISTRICT expanded its conservation program as a direct result of help given by Neighborhood Youth Corps enrollees," says Herman Link, chairman of the Buffalo-Ravenna Soil and Water Conservation District in Nebraska.

Link's comment is typical of many received from conservation district supervisors all over the State who were fortunate enough to get the services this past year of some of the 290 young people getting conservation work training under a cooperative project.

Emmett Lee, president of the Nebraska Association of Soil and Water Conservation Districts, goes further. "I am looking forward to an indefinite extension of this NYC project," he says. "I believe the districts, Soil Conservation Service technicians, and NYC enrollees all will benefit from their experiences in participating in such a project."



NYC enrollee, Nadine Dandridge (left) operates an engraving machine to make native grass identification tabs for the Nebraska Centennial grass plots. Steven G. Ottmans, assistant project director, looks on. Larry Hipp gets practice with the level while assisting SCS technicians overseeing the construction of a dam in the Pilger watershed, Stanton County Soil Conservation District.

Enrollees like NYC

And how do the young enrollees themselves feel about it?

One enrollee says, "I am very thankful to receive this opportunity of working with such thoughtful people. I am pleased to share the enjoyment of being a useful working citizen."

Another enrollee feels the program can have a strong impact on personal attitudes toward society. "If I hadn't received this opportunity, I don't know what would have become of me. Now I feel I belong."

An unsolicited letter from one of this year's enrollees says, "My name is Sandra Olejniczak, and I am a Neighborhood Youth Corps enrollee from Dakota County. I wish to thank you and all the people connected with the Youth Corps for making it such a worthwhile and rewarding experience. I have had the privilege of working with and meeting many wonderful people this summer. They have taught me much that I am sure will be of benefit to me the rest of my life. I am entering college soon, so I will be unable to sign up for the Neighborhood Youth Corps again."

Neighborhood Youth Corps enrollees, working under the sponsorship of the Nebraska Soil and Water Conservation Commission, do a variety of jobs. The boys help with conservation survey and layout, color and ink soil survey maps, interpret field survey notes, work on district and watershed maintenance activities, and help with other district activities including equipment maintenance.

The girls help with typing, filing, and clerical and secretarial work.

The NYC project is administered by three permanent commission staff members assisted by the local conservation district supervisors and district clerks. SCS technicians help with guidance and counseling. Supervisors and technicians both outline the work and training.

The commission-sponsored NYC project has been well accepted by the 86 districts in Nebraska. Seventy-eight of the soil and water conservation districts and 3 watershed districts have assisted in the training of 290 youths.

On to better jobs

Warren Fairchild, executive secretary for the Nebraska Soil and Water Conservation Commission, is proud of results to date. Besides training given the young people, he points to the improved prospects opened to "graduates." Of some 160 individuals "terminated," 75 have returned to school, 37 have graduated to better jobs or permanent jobs (3 of them as part-time employees of SCS), and 30 have left to enter military service. Training is currently being given to 130 youths.

The original agreement for the commission NYC project was signed into being on May 21, 1965, for a 6-month period. The original project called for 292 enrollees of which 42 were to be girls. This

project was amended twice by the Department of Labor, thereby extending it to August 31, 1966.

All soil and water conservation districts using NYC youths show an increase in conservation accomplishments the past year. Layout work, especially, has been speeded up, according to C. Dale Jaedicke, SCS State conservationist.

"We have been pleased to cooperate with the State commission in providing couseling and day-to-day supervision," said Jaedicke. "NYC enrollees have made material contributions to on-the-land conservation across Nebraska. Their practical training is resulting in a source of qualified youth for job needs of contractors, landscape nurseries, government, and others. We look forward to a continuing NYC program."

Due to success of the present project, the commission has submitted a request for another NYC contract to give work training to 100 individuals, 70 of them out of school and the other 30 in school.—J. Duane Chamberlain, *Project Director, Nebraska Soil and Water Conservation Commission, Lincoln, Nebr.* ♦

Urban Areas

(Continued from p. 77)

for help in erosion control. District and SCS officials recommended stabilization through temporary seeding of sudangrass and a permanent cover of Kentucky 31 fescue and bermudagrass. They also recommended a diversion, grassed waterway, and a small desilting basin.

Skeptical kibitzers doubted that anything would ever grow on the poor fill soil, but it did, and today the fescue and bermudagrass are more than 2 feet high. Erosion control is effective, and there have been no further complaints of sedimentation from this source.

Total conservation cost? An estimated $2,500 for the 15 acres of land worth at least $900,000. Thus, the owner spent less than 0.003 percent of the land's value to directly preserve that value. The cost of conservation on land in rapidly changing areas is almost always only a minute fraction of the land's value.

Somewhat similar is the case of the man who subdivided about 50 acres of sloping land. He built some $50,000 to $60,000 homes at the bottom of the hill, denuding the upper slope but doing no conservation work and leaving it without cover for more than a year.

Runoff water, not surprisingly, rushed downhill and carried great quantities of sediment into and around the expensive homes and driveways at the bottom. More lawsuits were threatened.

The developer was advised to fill in the gullies, complete the storm drainage system, use a temporary cover of vegetation, and put in grassed waterways. In addition, he was urged to complete the current work of street paving quickly and to keep a minimum amount of land exposed. He followed the recommendations with good results.

Developers, like most people, learn through experience, that conservation pays in money, land values, and community goodwill. More and more of them are buying special conservation equipment, such as hydromulchers, or discovering conservation uses for their regular equipment. A number of developers and builders are also employing people professionally trained in conservation methods.

What other steps can conservation-minded builders take, not only in Fairfax County but throughout the United States?

(1) First and most important, plan for conservation from the beginning, rather than waiting until storms have washed soil and debris downstream and lawsuits are threatened, costs are greater, and results more uncertain.

(2) Plan so that ground cover is off for the shortest possible time. The critical erosion period is after the natural cover is removed and before construction is completed.

(3) Use, as needed, debris basins, diversions, terraces, and grassed waterways. Also, seed both temporary and permanent vegetation following rough grading.

This does not need to be expensive. Actual costs for temporary vegetation in Fairfax County run about $62 an acre using machinery but no mulch, and $142 an acre with mulch.

Temporary vegetation will protect the site for 6 to 12 months. Permanent vegetation should be used for longer periods.

(4) Consider protective measures for trees and topsoil. Some large developers have special tree-moving machines that enable them to "stockpile" trees for later replanting. A few companies employ professional foresters.

Some conclusions

Perhaps the three major conservation problems in Fairfax County today are building developments that denude the land for long periods, existence of many homes on flood plains, and building on land with adverse topography.

The first two problems may gradually be coming under control as developers realize that they gain little and lose a great deal by such practices.

The use of land with adverse topography will probably become more acute, since much of the land with favorable topography is already built up. Conservation measures, therefore, will become more important as time goes on.

But conservation in developing urban areas is needed *now*. In Fairfax County, as in many others, by 1980 most of the land use decisions will be made and the conversions completed. If mistakes are made, great sums of money

will then be spent to correct what could have been prevented, but much of the loss will be irreparable. Urban land uses do not have the flexibility of farm uses; acres of cement and miles of underground wiring cannot easily be altered.

Some measure of county or other local controls appears necessary. It is unwise, however, to have conservation regulations so stringent that they cannot be enforced.

We must recognize that erosion control in areas of construction can never be complete. Some erosion will occur despite the best possible measures and the most conscientious application. The aim is to prevent controllable erosion and keep sediment and flood damages to a minimum. ♦

Planners' Institute Studies Environment

Under a $39,264 U. S. Department of Agriculture research contract, Purdue University engineers will conduct a 3½-year laboratory study to test equations expected to help scientists predict the depth and duration of floodwaters.

Sponsored by the Agricultural Research Service, the Purdue Research Foundation, Lafayette, Ind., will direct the study. Project leader will be Dr. G. H. Toebes, hydraulic professor in the University's Civil Engineering School. Heggie N. Holton, director of the USDA Hydrograph Laboratory, will represent ARS.

The engineers will use a tilting flume and various rates and depths of waterflow to simulate possible flood condtitions. ♦

Farm and Ranch Reporters

Some 700,000 farmers and ranchers are crop reporters, of whom about 60,000 cooperate in enumerative and objective yield surveys. ♦

New Resource Conservation Projects

FEDERAL ASSISTANCE to local sponsors of three new Resource Conservation and Development Projects, recently authorized by the Secretary of Agriculture, will accelerate economic development in communities of West Virginia, Alabama, and Missouri.

Little Kanawha, W. Va.

The Little Kanawha Resource Conservation and Development Project covers 1,165,440 acres in Wood, Wirt, Ritchie, Roane, and Calhoun counties with 68 percent of the area in woodland (90 percent in small private lots) and about 28 percent in crops and pasture. In this area are 81 streams with more than 1,027 miles of fishable water.

The project is sponsored by the Little Kanawha Soil Conservation District and the county courts of each of the five counties.

Over a 10-year period, project measures are expected to generate 12,775 man-years of employment. Continuing opportunities for hunting, fishing, and other recreation developments will provide 37,050 additional user-days annually.

The accelerated development of the area's land and water resources involves soil surveys; technical assistance for conservation planning and land treatment on crop, pasture, forest, and other land; watershed projects to curb flooding, improve drainage, and provide water supplies for municipal and recreation use; development of sewage-treatment facilities; construction of adequate roads and bridges for moving products to market; and educational programs to stimulate higher income throughout the area.

Coosa Valley, Ala.

Sponsored by the county governing bodies and the soil and water conservation districts of Clay, Calhoun, St. Clair, and Talladega counties, the Coosa Valley Resource Conservation and Development Project covers 1.6 million acres of land in the Appalachian Region of east central Alabama.

The Coosa River flows southeast through the limestone valley section of the area. About 70 percent of the area is in forest, 11 percent in grassland, and 9 percent in row crops. Population of the area is 200,000.

If all of the proposed 75 measures are installed, project sponsors anticipate that income in the area will increase more than $12 million annually over a 10-year period.

Project measures include completion of seven small watershed projects for flood prevention, municipal and industrial water storage, and recreation; improved timber and grassland management; accelerated conservation planning and land treatment; and improved public and private recreation facilities.

The sponsors feel that development of outdoor recreation facilities is one of the greatest income-producing potentials in the area. Recreation is expected to add 6,000 new jobs in the area over the next 10 years.

Three new lakes already developed on the Coosa River, covering about 40,000 acres, will increase the recreation prospects in the area. Measures designed to improve use of the Talladega National Forest coupled with recreational developments undertaken by individual landowners will further add to the recreational opportunities.

Top of the Ozark Rivers, Mo.

The Top of the Ozarks Rivers Resource Conservation and Development Project includes five counties, Dent, Howell, Oregon, Shannon, and Texas and covers

2,970,880 acres. About 1,595,800 acres is in 7,987 farms, 10 percent being in cropland and 69 percent in woodland. Of the wooded area, 1.6 million acres is privately owned, about 77,000 acres State owned, and 327,000 acres in National Forests.

Project sponsors are the four soil and water conservation districts in Dent, Oregon, Shannon, and Texas counties, the five county courts, and the University of Missouri Extension councils.

Immediate benefits will be an increase in income from agricultural and forest products. Long-range benefits include creating an estimated 15,000 new job opportunities and an increase of several million dollars annually in gross income to the area.

In addition to accelerating technical assistance and services to farmers and land operators for soil surveys, conservation planning, land treatment, and forest management, the project will include 234 additional measures planned by various local groups. These include highway and bridge improvements, city and highway beautification, sewage disposal, hospitals, county health units, homes for senior citizens, recreation enterprises, education and training facilities, and industrial developments to create new jobs.

Included in watershed-protection and flood-prevention projects are measures to provide relief from flooding; reduce erosion; control sedimentation; furnish irrigation, drainage, municipal and industrial water supplies; increase fish and wildilfe; and create recreation opportunities. ♦

Estimating System

USDA's agricultural estimating system is vastly more complex than it was a century ago, utilizing sophisticated sampling theory and electronic computers, as well as older methods of fact collection. ♦

CONSERVATION PROFILE

J. Harris Smith

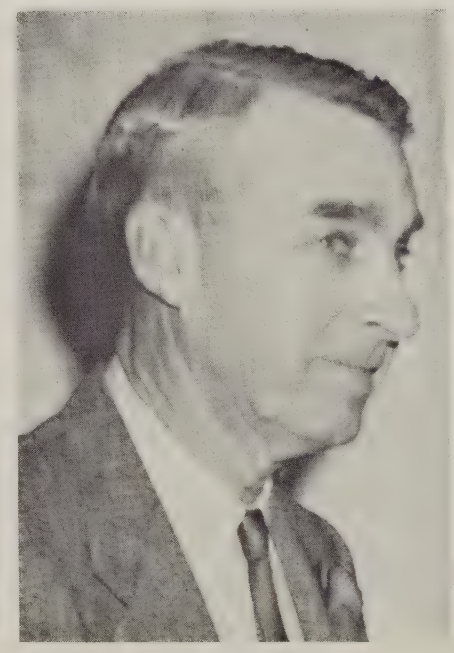
Tennessee

Busy conservationist reaps many honors in State

TENNESSEE'S dean of conservation districts, J. Harris Smith, has not celebrated a birthday at home for several years.

"It comes in February," the tall Tennessean says, "and I'm always attending the National Association of Soil and Water Conservation Districts' annual convention. I turned 72 at New Orleans this year."

Mr. Smith's energy and untiring interest in district activities can be seen in his convention attendance record. He has appeared at 15 of the past 20 NACD conventions. He has missed only 1 meeting of the Tennessee Association of Conservation Districts since he helped to organize the group more than 22 years ago and that was because of illness.



Born and reared in a rural community near Jackson, Tenn., Mr. Smith has devoted his life to farming, except for a brief period in uniform during World War I. As a boy, he learned the basic chores of feeding, hoeing, and cutting firewood. At an age when most present-day youths are just learning to use a power lawn mower, Mr. Smith was plowing with a team, picking cotton, and doing a grown man's work on other jobs.

In the years before World War I, Harris Smith and his older brother, John Smith, bought a 150-acre farm on credit and started out together. By mutual agreement, this partnership was dissolved in a few years, and each determined to succeed independently.

In 1924, Mr. Smith took on a new partner, when he married Miss Annie Lake, a farm girl turned school teacher from Hardeman County.

The Smiths have lived and worked on the same farm in Madison County since their marriage. The original "home" farm consisted of 30 acres. They have added land until now they own and operate 1,028 acres. Their farming enterprises include corn, cotton, hay, pastures, and Angus cattle.

In 1941, the Madison County Soil Conservation District was organized. Local agricultural leaders, knowing of Harris Smith's keen interest in soil conservation, asked for his help in developing a program of work for the district. He accepted the job, became a member of the first board of supervisors, and served as its treasurer until 1945. At that time, he was elected chairman of the board, a position he has held continuously.

In addition to being a soil conservation district supervisor and a leader in his community, his interest and influence have con-

tributed greatly to agriculture over west Tennessee and throughout the State.

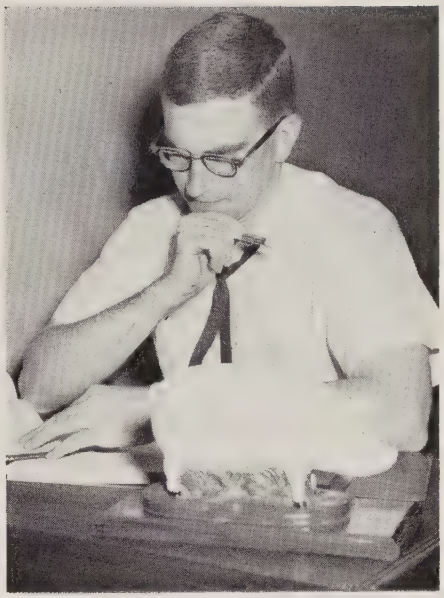
In 1942, only 18 out of Tennessee's 95 counties were in organized soil conservation districts. Mr. Smith, together with a dozen other agricultural leaders, met and organized the Tennessee Association of Soil Conservation District supervisors. He served for 3 years as president of this organization which now includes districts in all 95 counties and 77 organized watersheds. He also served the State organization as area vice president, and at present is a director.

The many honors won by J. Harris Smith include the "Master Farmers Award," sponsored by the *Progressive Farmer* Magazine and the University of Tennessee's Agricultural Extension Service. He also won the "Grand Sweepstakes Award" in the owner-operator division of the Save-Enrich-Our-Soil Contest, sponsored by the Memphis *Press Scimitar* in 1954, and in 1962, his fellow supervisors of the Madison Soil Conservation District board presented him with a distinguished service plaque.

In addition to his active soil conservation district work, Mr. Smith is presently the senior member of the Madison County Court. Elected in 1930, he has served his community and county as a magistrate continuously for 36 years.

Mrs. Smith is also a firm believer in soil and water conservation. She is a member of the Ladies Auxiliary of the Tennessee Association and is presently serving as its treasurer.

Harris and Annie Smith live in a beautiful country home on the farm they moved to when they were first married. They have one son, a medical doctor, and three grandchildren. ♦



George Fox at his desk at home.

Youth Conference Sets Goals for Creative Conservation

By George Fox
State President, Indiana FFA Association, Michigantown, Ind.

"IT IS THRILLING to me that for the first time in history, America's major youth organizations are joining hands for a common purpose. It is doubly thrilling to me that this purpose is environmental beauty."

The words were Mrs. Lyndon B. Johnson's as she spoke to us during the National Youth Conference on Natural Beauty and Conservation, June 27.

Indeed there is something "thrilling" about unity. It's the same creative tool I have seen SCS people using in my conservation district where they have successfully demonstrated that man and nature are not separate.

Unity, I believe, is a necessity of creative conservation. That's why I think it is significant that 20 million young people joined the cause of conservation during the National Youth Conference on Natural Beauty and Conservation.

The conference heard President and Mrs. Johnson urge the members of our organizations to dream impossible dreams and to translate the dreams and talk of today into the action of tomorrow. Among the final recommendations were:

That youth groups raise scholarship money to send teachers to conservation courses.

That manufacturers install litter containers in all automobiles, and advertisers emphasize "anti-litter" rather than "throw away" messages.

That young people take pictures of community eyesores and show them to their cities' editors.

That juvenile offenders work off their punishment in park beautification and maintenance.

That our organizations work together from now on, just as we did for the conference.

We realize our limitations and hope for guidance and support from adults. Even though some organizations start their interest in natural beauty and conservation with an obvious project like "litter prevention," they may readily be led into larger projects. More important, those who start with a vague kind of "beauty" objective can be led into an understanding of the unity of man and nature.

In this space age, it is easy to believe that the world was created for man's exploration and enjoyment. Such a belief has scarred the beauty of our Nation and wasted its natural treasures. We want to be the generation that changes this philosophy. This, in the long run, may be the real lasting value of our project.

George Fox, representing the Future Farmers of America, was chairman of the National Youth Conference on Natural Beauty and Conservation, held in Washington, D. C., last June as a followup on the White House Conference on Natural Beauty.

Soil conservationists and other adults who are well informed about conservation can help by:

Volunteering as a consultant. It is important when working with many youth organizations that you first approach the local *council* that has jurisdiction over individual troops or units in the area, rather than going directly to an individual unit.

Helping adult leaders gain conservation skills or knowledge that they in turn will share with members.

Inviting youth representatives to attend soil conservation district meetings as a part of their education, since districts are local bodies banded together to do the conservation job.

Inviting youth groups to tour watershed projects or be included in other ongoing conservation activities.

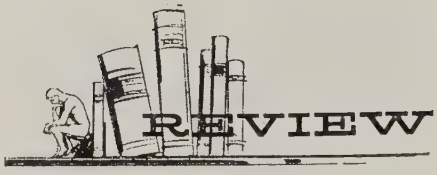
Urging the local Youth Programs Committee to send reports on its projects (pictures before and after if possible) to: The Coordinator, National Youth Conference on Natural Beauty and Conservation, 830 Third Avenue, New York, N.Y. 10022.

Finally, remember that many of the young people who attended the conference will be able to draw other groups into this challenging crusade for creative conservation and beauty. ♦

Grazing after Sagebrush Control

In grazing ranges after sagebrush control (1) avoid trailing livestock the first fall and winter across areas where sagebrush has been eradicated; (2) delay grazing until native grasses are vigorous and seeded forage plants are well established, as evidenced by seed production; and (3) practice good grazing management after the new forage stand is well established. ♦

USDA now has continous data for major crops and livestock since 1866. ♦



Origins of American Conservation. Edited by Henry Clepper. *1966. Ronald Press Co., New York (for Natural Resources Council of America). 193 pp., illus. $4.50.* This small book offers information about the origins of the various major fields of conservation. It includes chapters on the conservation movement in general and on conservation of wildlife, forests, fisheries, soil, water, range, parks, wilderness, and scenic and historic sites.

Each chapter is a short history of the development of conservation in one of these fields. A final chapter deals with the outlook for the future.

Twelve authors, all professionally engaged in their respective fields, have written the chapters. The editorial committee included Edward H. Graham, Daniel E. Poole, and the chairman, Henry Clepper, who also wrote the first chapter.

This is not offered as a definitive historical treatise but as a useful reference for anyone seeking information about the many developing phases of conservation. The editor states that no other volume of this sort is available.—William R. Van Dersal, *Deputy Administrator for Management, SCS.*

New Publications

Effects of Stocking Rates on Range Vegetation and Beef Cattle Production in the Northern Great Plains. By Walter R. Houston and R. R. Woodward. *1966. USDA Tech. Bul. 1357. 58 pp., illus.* Data from studies conducted in an area of mixed-grass prairie typical of the semiarid southwestern part of the northern Great Plains. At each of two separate areas, six pastures of native range were grazed each at a different stocking rate.

Calf weights at birth and weaning, rate of gain, grade, and value of calves produced per breeding cow were reduced by heavy stocking rates. Animal production per acre of grazing land was reduced at the heaviest stocking rate to below its previous level but not below the current level of lighter stocking rates.

A Century of Agriculture in Charts and Tables. *1966. USDA Agr. Hbk. 318. 44 pp., illus.* Gives in graphic and table form the production trends of major crops and livestock since 1866. The information is the product of a crop and livestock estimating system that is based on voluntary cooperation of farmers and other citizens and on the close collaboration of the States and the Federal Government.

Evaluating a Program of Conservation Education in the Elementary School. *1966. Interstate Printers and Publishers, Danville, Ill. (for Conservation Education Association). 40 pp. 50¢.* This booklet is No. 4 in a series entitled "Education . . . Key to Conservation." It contains a suggested scorecard for judging a conservation education program on the basis of philosophy, personnel, program, organization, principles, and conservation (i.e. subject matter).

Appalachian Hillside Pasture. *1966. USDA Leaflet 543. 4-page folder.* Basic information on using native pasture for feeding a few head of cattle or sheep in Appalachia (W. Va., and parts of Ala., Ga., Md., N. Y., N. C., Ohio, Pa., S. C., Tenn., and Va.).

Economics of Forestry. Compiled By Fay Rumsey. *1965. USDA Misc. Pub. 1003. 45 pp.* A bibliography for the United States and Canada, 1960-62.

Soil Surveys

Somerset County, Maryland. By Earle D. Matthews and Richard L. Hall. *1966. 90 pp., illus.; maps 4 inches to the mile (1:15,840).* Survey by F. Z. Hutton, Sr.; H. H. Boston; F. A. Filios; Allen Greiner; Richard L. Hall; and Ronald Jones.

Tippah County, Mississippi. By William E. Bright, William I. Smith, Malcolm C. Tyler, W. L. Watts, R C. Carter, H. S. Galberry, and W. W. Nye. *1966. 96 pp., illus.; maps 4 inches to the mile (1:15,840).*

Bexar County, Texas. By F. B. Taylor, R. B. Hailey, and D. L. Richmond. *1966. 126 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Berkeley County, West Virginia. By John L. Gorman, J. K. Pasto, and C. D. Crocker. *1966. 141 pp. illus.; maps 3.17 inches to the mile (1:20,000).*

From the Administrator:

Conservation Challenges in New Urban Areas

GROWING urban areas throughout the country create new problems in land use and resource conservation that increasingly engage the attention of professional conservationists, public officials, and local citizens.

Almost every growing urban area is in a soil conservation district, for the simple reason that 95 percent of rural America, outside of major public land areas, is in organized districts.

Wherever rural land is being converted to residential, industrial, or similar uses, the disrupting changes almost without exception are occurring within the jurisdiction of a local governmental unit responsible by law for programs of land and water conservation.

The problems of judging suitability of different soils for alternative uses, of controlling erosion during conversion from one use to another, of stabilizing each area after the new use is established, and of regulating runoff under the new hydrologic conditions—all these, and many related problems, call for different solutions under urban conditions than in the more familiar agricultural situations.

But basically, they are concerned with the same fundamentals of soil and water use that soil conservation districts and cooperating technical agencies have been dealing with for the past 30 years.

Many conservation districts now find themselves working with an increasing number of nonagricultural cooperators, such as local governments, school systems, planning commissions, various conservation organizations, land developers, industries, and urban residents.

The Soil Conservation Service, through its working agreements to provide technical services to conservation districts, finds itself correspondingly involved in conservation problems related to the conversion of agricultural land to nonagricultural uses.

The National Association of Soil and Water Conservation Districts, in a recent appraisal of the situation, concluded that if conservation districts are to make their most effective contribution to our society in the future, they must adjust their programs to embrace new phases of conservation and resource development.

The conclusion applies with equal force to the technical and professional conservation agencies responsible for providing the information and knowledge needed to find sound solutions to the new conservation problems.

If the new conservation demands of urbanizing areas are to be met, conservation districts (and supporting technical services) need to be broadened to (1) involve more people in resource work, (2) extend conservation services to additional people, and (3) place more emphasis on broad-based resource planning and accomplishment.

At the same time, the original purpose of conservation districts must continue to be to serve as effective local action organizations to get as much total conservation on the land as fast as possible.

In many cases, conservation districts could perform some of the work being taken on by the proliferation of new groups. The result would be less duplication, better coordination, and more efficient and useful programs.

The challenge that lies ahead is an exciting one. Whether it will be met depends on local leadership—it does not depend primarily on the National Association of Soil and Water Conservation Districts, the State associations, the State soil and water conservation committees, the Soil Conservation Service, or on any of the other agencies with whom districts work. Local leadership is still the key to moving ahead.

A fresh look at district opportunities is in order, as the country takes new interest in resource affairs under growing pressures at home and abroad.

Many State governments already are considering changes in State laws needed to broaden district mandates, increase representation of all community interests in the administration of districts, and provide the financial support and legal tools for conducting conservation programs aimed at resource and economic development, both rural and urban.

But more than State action is involved in strengthening the role of districts in resource planning and action. Federal programs and policies need to further recognize the ways in which the local conservation district can serve as a unique and valuable mechanism for unlocking the gates to action on the lands, forests, and streams of the countryside.

The importance of developing a responsible partnership between district officials and all conservation agencies has never been as important as it will be in the years ahead.

Genuine interest on the part of all concerned can lead to district programs of sufficient breadth to help advance *all* resource interests and the programs of *all* resource agencies to the benefit of *all* citizens.

The basic theories and ideas under which the system was established 30 years ago are as sound today as they were then. Implementation is even more urgent today then ever.

D. A. WILLIAMS

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America The Beautiful

America The Beautiful—Missouri FARM POND FOR STOCK WATER AND RECREATION
CAPE GIRARDEAU COUNTY SOIL AND WATER CONSERVATION DISTRICT

The "America The Beautiful" photo exhibit—one picture for each State, Puerto Rico, and the Virgin Islands—has been reproduced in full-color lithographs suitable for framing. Prints are available from the Superintendent of Documents for 10 cents each or $5.00 for the complete set. Order blanks can be obtained from local Soil Conservation Service offices and at most post offices.

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Dorothy
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DECEMBER 1966
VOL. 32 NO. 5

Soil Conservation

DEVOTED TO THE WISE USE OF
LAND AND WATER RESOURCES

WATER MANAGEMENT

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SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE

Soil Conservation

Devoted to the wise use of land and water resources

DECEMBER 1966 VOL. 32, NO. 5

Control . . .

Water conservation, as the Administrator emphasizes this month (p. 119), is a matter of managing the available supply to meet peoples' needs.

Management requires means of controlling the distribution and movement of water. SCS is deeply engaged in helping landowners and local communities plan and install measures for water control.

The structures themselves — dams, diversions, drainage ditches, irrigation systems—are not conservation measures *per se*. It is how they are used, and to what purpose, that determines whether the result is conservation or waste.

Farm drainage is a case in point, as Associate Administrator Gladwin Young points out (p. 111).

Precision: The more precise the water-control system installed, and the more skillful its use, the more efficient the resulting water management. Louisiana Conservation Engineer K. V. Stewart, Jr., illustrates with examples (p. 105) of landforming that permits removal of water at one season and adding it as needed at another.

Framework: Water management can miss its mark, however, if objectives have not been clearly defined. New guides are emerging from river basin studies that begin with framework plans then pursue special problems within that framework. Eugene Buie explains (p. 102) the system of surveys that now involves three-fourths of our mainland area.

COVER: Snow in the high mountains of the Rocky Mountain National Park, as throughout the West, is under constant watch by SCS to enable forecasters to anticipate the summer water supply in valleys below.

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SOIL CONSERVATION is the official organ of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. The printing of this publication was approved by the Bureau of the Budget July 25, 1963.

ORVILLE L. FREEMAN — Secretary of Agriculture
JOHN A. BAKER — Assistant Secretary of Agriculture
DONALD A. WILLIAMS — Administrator, Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service, U. S. Department of Agriculture, Washington, D. C. 20250

BEN O. OSBORN, Editor
GEORGIE A. KELLER, Production Editor

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Resource plan starts economic improvement

Northern Rio Grande RC&D Project

By Vincent W. Shally
Assistant State Conservationist, SCS, Albuquerque, N. Mex.

HOW A RESOURCE conservation and development plan can galvanize local people and government agencies into action for the mutual goal of economic betterment is being demonstrated in the Northern Rio Grande Resource Conservation and Development Project (RC&D) in north-central New Mexico.

In just 2 years the 25 sponsors have set in motion project measures that created 35,000 man-days of employment and brought $398,000 of additional income to the 4-county area in 1965.

The project sponsors have received 162 proposals for such measures as marketing and processing facilities, income-producing recreation enterprises, flood-control and watershed-protection projects, community irrigation improvements, municipal recreation developments, access roads, expansion of native arts and crafts industries, beautification of highways, and many others.

These proposals are submitted by the local people who propose to carry out their own projects with their own funds and facilities and with the technical, financial, and long-term credit assistance from all available sources.

The sponsors who prepared the overall plans and coordinate the activities include the State of New Mexico, the counties of Taos, Rio Arriba, Santa Fe, and Los Alamos, the municipalities of Santa Fe, Espanola, and Taos, four RAD associations, seven State agencies and commissions, the Northern Indian Pueblos Association, and five soil and water conservation districts.

Assisting the sponsors in the development and implementation of their work plan are a large number of local, State, and Federal agencies.

The basic project work plan was prepared in 1964, and the Secretary of Agriculture in October authorized Federal assistance in putting it into operation.

The status of the 162 project measures approved by the steering committee to date is as follows:

Sixty-seven groups have been assisted in developing their plans and have either completed construction or have construction underway.

Seventy groups are being assisted in the preparation of their plans.

Twenty of the groups are pending the programing of assistance for planning their proposed activities. Some preliminary planning has been done on a number of these.

Five are of long-range nature. Some require new legislative authority or changes in the present laws and regulations. The agencies and organizations involved have been contacted for their guidance and assistance in implementing these projects.

An estimate of costs and returns of the measures completed or near-

The RC&D project will develop markets for specialty products, such as Spanish foods baked in these adobe ovens (ornos) in Espanola.

ing completion indicates that they have cost about $1,675,000. The local participating groups have expended more than $1,300,000; cost-sharing and loan funds make up the balance. The estimates indicate that these completed projects will mean more than 400 additional man-years of employment in the area.

Among the project measures scheduled for completion in the immediate future is the Duke City Lumber Production Mill at Espanola, which initially will provide employment for a minimum of 35 men at the mill plus an additional 100 or more for logging operations. The mill is tentatively scheduled to begin operations the early part of 1967. A substantial weekly income and full use of the timber resources will result in the project area.

Another project measure now underway is the Rancho de Chimayo recreation facility involving the conversion of a small farm to an income-producing recreation facility. When fully developed, this enterprise will create an average of 30 or more man-years of employment and bring an estimated $100,000 additional income annually to the village of Chimayo.

The Sebastian - Martin - Black Mesa Watershed Project is being planned under Public Law 566. By reducing flood damage to crops and irrigation systems, it will enable farmers to invest in the production of higher-income specialty crops, such as chile, cucumbers, and orchard fruits.

With financial assistance from RC&D funds, the town of Taos will be protected by a flood-control dam to be constructed above the town. When completed it is expected to eliminate one of the most obvious deterrents to the economic growth of Taos.

An ambitious plan to publicize the recreation facilities and potentials of northern New Mexico has been undertaken by the project sponsors. Included will be brochures, pamphlets, and information guides. Information for use in travel sections and vacation editions of newspapers are planned.

Basic to the success of the project have been the cooperative efforts and contributions of local, State, and Federal agencies and organizations. Here are some examples of how agencies are helping:

Museum of New Mexico has assisted with inventory and selection of sites for development as historic sites.

State Engineer Office has encumbered or paid cost-share grants totaling nearly $42,000 to 22 community irrigation ditch groups in the project area. These funds were made available by the New Mexico Legislature for community ditch improvements.

State Department of Forestry has assigned a marketing and utilization specialist to assist with forestry project measures and leadership on forestry problems in the project area. The department is using matching RC&D funds.

New Mexico Department of Game and Fish has planted nearly 1¼-million fish in streams within the project area. This is one-fifth of the statewide trout plantings.

New Mexico Highway Department has completed construction on 55 miles of highway at a cost of more than $8 million. This includes the spectacular Rio Grande Gorge Bridge near Taos which opens hitherto inaccessible recreation areas to tourists.

State Parks and Recreation Department has continued development of State parks in the project area, including the purchase of an

Modern concrete linings for irrigation ditches are replacing old systems (right) that wasted much of the precious water on which New Mexico farmers depend.

additional 537 acres from the Bureau of Land Management for development of public recreational sites in the Rio Grande Gorge State Park.

State Soil Conservation Committee has provided overall leadership in soil and water and other resource conservation and development work. The chairman is also a member of the project sponsors' steering committee.

State Department of Development is providing assistance on individual projects involving industrial developments.

State Division of Economic Opportunity has coordinated the programs under the Economic Opportunity Act, including Neighborhood Youth Corps, Community Action programs, Headstart, Adult Basic Education, and Work Experience programs.

Soil Conservation Service is assigned administrative responsibility and leadership by the Secretary of Agriculture in assisting the sponsors plan and carry out the project action plan. It has provided the technical assistance to groups and individuals in the detailed planning and implementation of many of the project measures.

Extension Service has carried on intensive education programs among leaders and farmers in soil and water conservation and marketing and processing of agricultural products.

Economic Research Service has assisted in evaluating the economic feasibility of project measures and their impact on the project area.

Farmers Home Administration processed 307 loans totaling $987,430 during 1965. This is a 150 percent increase from the number of loans on record January 1.

Agricultural Stabilization and Conservation Service has contributed to the conservation and development of water resources, one of the chief aims of the project, through its ACP special projects. In the RC&D area 28 project measures with an estimated cost of more than $364,000 are underway.

Forest Service has carried out extensive developments on range, recreation, wildlife, and road and trail development as part of its regular activities. It has provided assistance on timber utilization project measures, such as the "Duke City" project scheduled for operation in 1967. With RC&D funds, this agency and the University of New Mexico are conducting a study of the feasibility of pulpwood production in the project.

Bureau of Indian Affairs has reported impressive accomplishments by Indian pueblos on RC&D project measures. These include roads to recreation areas, range and irrigation improvements, historical site development, and watershed-protection projects.

Bureau of Land Management reports considerable range-improvement work since the project was authorized for operation. A great deal of this was done in cooperation with local soil and water conservation districts.

Soil and water conservation districts have provided leadership and coordination of activities in planning and promoting the project. Five districts are among the formal sponsors of the project: Taos, Espanola Valley, Abiquiu-Vallecitos, Pojoaque-Santa Cruz, and Santa Fe-Sandoval.

The leadership and cooperation developed through the RC&D approach is noted by the local people and visitors alike. This development of leadership and cooperation is in itself one of the most outstanding accomplishments of the Northern Rio Grande RC&D Project. ♦

A makeshift diversion dam made of old car bodies and brush is typical of many antiquated dams to be replaced by well-engineered diversions and ditches in the RC&D project.

River Basin Surveys

Data from framework and detailed studies are already shaping local water plans

By Eugene C. Buie
Director, River Basins Division, SCS

COMPREHENSIVE river basin investigations are now underway in every one of the 48 States and cover about 75 percent of the Nation's contiguous land area. Forty-three separate surveys are in progress.

Although none of the "framework" or "detailed" studies carried out under the coordination of the Water Resources Council has been completed, their findings are already being put to good use in many places.

In the Ohio River Basin, for example, the framework study underway there has identified 12 tributaries within which watershed projects under Public Law 566 can make significant contributions to meeting the total water needs of the region. The studies indicate where the relationships of these projects with other potential developments are sufficiently complex to call for more detailed investigations.

The Ohio River Basin investigation is scheduled for completion in July 1967.

Wabash findings

In the Wabash River Basin, the comprehensive detailed investigation has identified tributary areas where both upstream and downstream works of improvement are needed for complete development. It also has found other areas where both upstream and downstream works are feasible but the two types are completely competitive; only one or the other can be installed. The investigation will supply the facts on which the appropriate decision makers can choose the course that most adequately meets their objectives.

Such information also provides the State agency with data it needs to establish priorities for planning Public Law 566 watershed projects.

Types of studies

The Soil Conservation Service participates in four types of river basin investigations under the provisions of Public Law 566:

(1) Interdepartmentally coordinated comprehensive *framework* studies (type I).

(2) Interdepartmentally coordinated comprehensive *detailed* studies (type II).

(3) Specific *project* studies (type III).

(4) *Cooperative* comprehensive studies (type IV).

A comprehensive river basin investigation provides an inventory and analysis of the water and related land-resource problems and needs of a river basin. It also identifies alternative means of solving the problems and meeting the needs.

Information developed by an investigation permits State and local as well as Federal agencies to make rational decisions as to (1) the nature, scope, and type of projects likely to meet the needs of the basin; (2) the relative timing of the projects in the best interests of all the people of the basin; and (3) the identification of areas that would benefit from specific types of developments.

All the Federal water-resource agencies and the concerned States cooperate in making type I and type II studies, which are carried out under the auspices of the Water Resources Council.

Type III studies are specific project investigations, such as a potential Public Law 566 watershed project or a Corps of Engineers reservoir.

A type IV study is made as a cooperative effort between the Department of Agriculture and a State or another Federal agency.

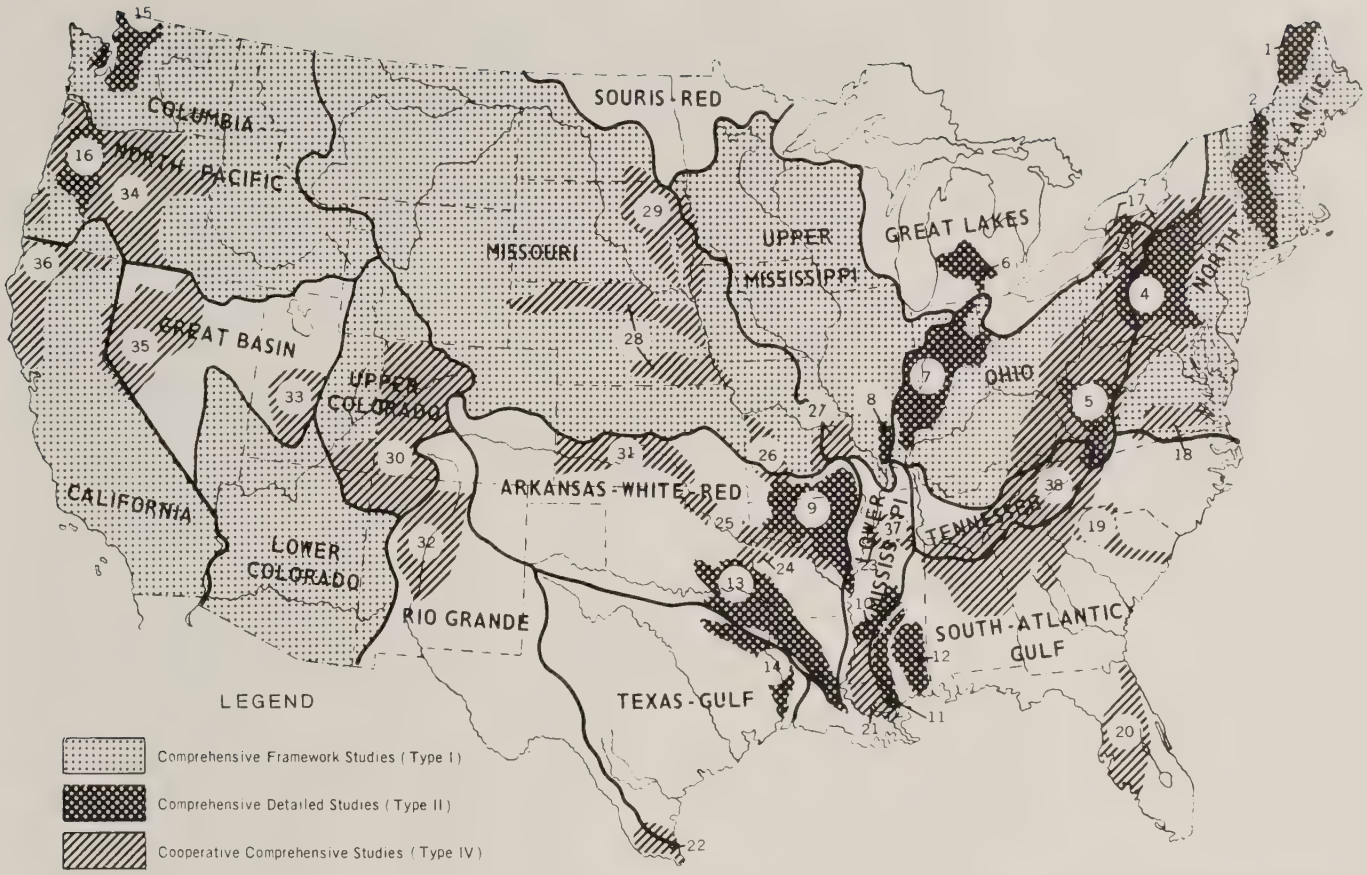
The Water Resources Council was created by the Water Resources Planning Act of 1966. The stated purpose of this law is "to provide for the optimum development of the Nation's natural resources through the coordinated planning of water and related land resources, through the establishment of a water-resources council and river basin commissions, and by providing financial assistance to the States in order to increase State participation in such planning."

The council is composed of the Secretaries of Agriculture; the Army; the Interior; and Health, Education, and Welfare; and the chairman of the Federal Power Commission. The chairman of the Water Resources Council is designated by the President, and currently is the Secretary of the Interior.

In addition to other duties, the council must maintain a study of the relation of river basin plans to the requirements or needs of larger water-resource regions. It establishes principles, standards, and procedures for Federal participation in regional or river basin planning and for the formulation and evaluation of Federal water- and related land-resource projects.

Studies underway

Eight framework (type I) studies are underway. This type of study does not identify specific projects but rather establishes a framework of program and project interrelationships within which individual projects of all local, State, and Federal agencies can be



Forty-three river basin surveys of three types are underway in the United States. Framework surveys (type I) are being made for all the 8 major water-resource regions named on the map. Detailed comprehensive (type II) and cooperative (type IV) surveys are being made in the river basins indicated by numbers as follows:

Type II. Comprehensive Detailed Surveys

1. St. John
3. Genesee
4. Susquehanna
2. Connecticut
5. Kanawha
6. Grand
7. Wabash
8. Big Muddy
9. White
10. Big Black
11. Pearl
12. Pascagoula
13. Red
14. Sabine
15. Puget Sound
16. Willamette

Type IV. Cooperative Surveys With State or Federal Agencies

17. Western New York
18. James River
19. Santee River
20. Florida Rivers
21. Mississippi River Independent Streams
22. Lower Rio Grande
23. Chickasaw
24. Poteau
25. Arkansas Multiple Purpose Project
26. South Grand and Osage
27. Meramac
28. Elkhorn, Big Blue, Niobraba, and Nemaha
29. James and Big Sioux
30. Colorado Rivers
31. Arkansas in Kansas
32. Upper Rio Grande
33. Sevier
34. Oregon Rivers
35. Humboldt-Central Lahontan
36. North Coastal River
37. Hatchie
38. Appalachian Water Resources Survey

carried out in proper relationship to each other.

Where these interrelationships are complex, more detailed comprehensive studies, such as those carried out under type II and type IV procedures, are indicated.

There are 15 comprehensive detailed studies (type II) underway. The main objective of these studies is to identify specific projects within a river basin which should be started within the next 15 years to meet identified needs for water-related goods and services.

Five detailed studies are scheduled for completion by June 1967. Since these studies were started without the benefit of a prior framework study, it has been necessary to carry on the framework study concurrently with the detailed investigations in order that overall economic needs and interrelationships could be established.

Cooperative studies

Twenty cooperative comprehensive studies (type IV) are underway. Sixteen of these are in cooperation with State and local agencies, 3 with the Corps of Engineers, and 1 with both State agencies and the Corps of Engineers.

Generally, these cooperative studies involve specific objectives of the sponsoring organization and of the Department of Agriculture. Usually they concentrate on recognized water-resource problems of the State concerned and analysis of the potentials of Public Law 566 projects to meet identi-

fied needs. They provide local people with essentially the same guidances as do type II studies.

Sixteen cooperative studies have been completed. They have resulted in such improvements as:

(1) More comprehensive and efficient watershed projects in Mississippi;

(2) New soil conservation districts and an RC&D project in Oregon;

(3) The coordination of water-based recreation potentials between upstream and downstream structures in Missouri;

(4) Identification of the interrelationships between potential upstream and downstream projects in North Carolina;

(5) An evaluation of the effects of watershed treatment and management on water supply for irrigation in Nevada.

Each of the completed and going studies is providing local organizations with information for making decisions regarding priorities and scope of upstream development projects.

In all these studies, the Department is represented by a team composed of technical specialists of the Soil Conservation Service, Forest Service, and the Economic Research Service. Other agencies of the Department participate as problems dictate on a case-by-case basis. USDA participation is coordinated by a field advisory committee representing the three agencies and chaired by SCS.

Departmental participation

Investigations and analysis are made by a river basin staff made up of a staff leader, economists, engineers, hydrologists, geologists, and sometimes soil scientists and soil conservationists. The size and actual composition of the staff depend on the nature of the study.

Type I and type II studies usually take from 3 to 5 years. Type IV studies usually take 3 to 4 years, although special studies may extend over longer periods of time.

In all cases the final objective of the USDA team is to determine how, where, and when departmental project-type programs can be used effectively to meet the needs for water-related goods and services in a river basin and to assure that agricultural interests are identified and protected in any overall water- and related land-resource development program.

Watershed projects

In the framework (type I) studies, the team identifies those river basins where upstream watershed projects can make a significant contribution toward meeting the needs of the region.

In detailed and cooperative studies, it determines which watersheds could be developed into feasible upstream watershed projects and further identifies those that need to be started within the next 10 to 15 years to meet local needs. These investigations also identify other opportunities to meet needs for recreation, municipal and industrial water supply, and water storage for pollution abatement through low flow regulation.

River basin investigations also identify watersheds that have little or no possibility as upstream watershed projects. This information can keep local people from developing false hopes and spending money in anticipation of a project that is not economically feasible.

Local and State agencies can benefit materially from the results of these studies. Local people can be made aware of opportunities to alleviate their problems, can utilize the studies for guidance in submitting applications for planning assistance, and can be guided as to purposes which should be included in a watershed work plan.

River basin studies provide a means of informing local and State agencies of the broad concepts of water- and related land-resource development and of building local leadership in this field. ♦

National Conservation Field Day

A feature of the 1966 National Conservation Field Days and Plowing Contest at Jefferson, Iowa, was a 90-minute conservation tour.

Tractor-drawn wagons carried interested spectators to points of interest. Here, John Wilson, work unit conservationist, describes a pasture-renovation project while his audience views the results. ♦

Improved Land Grading Gives Complete Water Control

By K. V. Stewart, Jr.
State Conservation Engineer, SCS, Alexandria, La.

CAREFUL land grading on land needing drainage at one season and irrigation at another is giving soil conservation district cooperators in Louisiana complete water control and greater efficiency.

The elimination of small fields makes possible the use of large equipment, and water can be removed with minimum erosion when necessary; or it can be applied to crops when needed.

The Soil Conservation Service recommends eliminating 50 to 75 percent of old contour levees on most ricefields and realining the remaining levees to follow straight lines or smooth curves.

Water leveling, a special technique of land grading introduced several years ago by the Louisiana Rice Experiment Station at Crowley, has gained favor with many soil conservation district cooperators in the Gulf Coast Prairie of southwest Louisiana where rice is an important crop.

In using this method, the farmer plows the land, floods the field, and, with farm tractors and scrapers, moves soil from high places to low ones until water stands at an even or nearly even depth between levees. A natural hardpan supports tractors in the flooded field and prevents bogging.

District cooperators now using various land-leveling methods can vouch for their value in the installation of complete water-management systems on Louisiana bottom land.

Take, for example, the Hollybrook Land Company, near Lake Providence, which is moving a half million cubic yards of earth to grade its land. In one area, grading created one 210-acre field where there had been 11 fields before. Manager Jack Hamilton says the work will pay for itself in 3 years. More than 425,000 yards of earth have already been moved, part of it at the rate of 1,500 cubic yards an acre.

On the Hollybrook Plantation, owned by the Amacker family, the principal products are cattle, corn, cotton, and soybeans.

Surface ditches, to get rid of surplus water, were once considered all that was necessary. As with most such systems, the ditches were often crooked and left small odd-sized areas that were difficult to manage. Other shallow ditches, constructed across the rows to facilitate drainage, were hard to cross with farm machinery.

Manager Hamilton, a graduate of Louisiana State University, studied new systems being installed on other farms. One of the better systems involved grading the land surface to eliminate the ridges and filling the low areas that trap water. With the grading, the farmer constructs a rectangular system of surface ditches and lays out his crop rows parallel with the lateral ditches.

Soil conservationists design the grades to remove surface water in time to avoid crop damage but flat enough to prevent erosion. The survey provides essential information for planning the water-management system. Often it is possible to locate surface field ditches where changes in soil occur, making each field unit of similar soils.

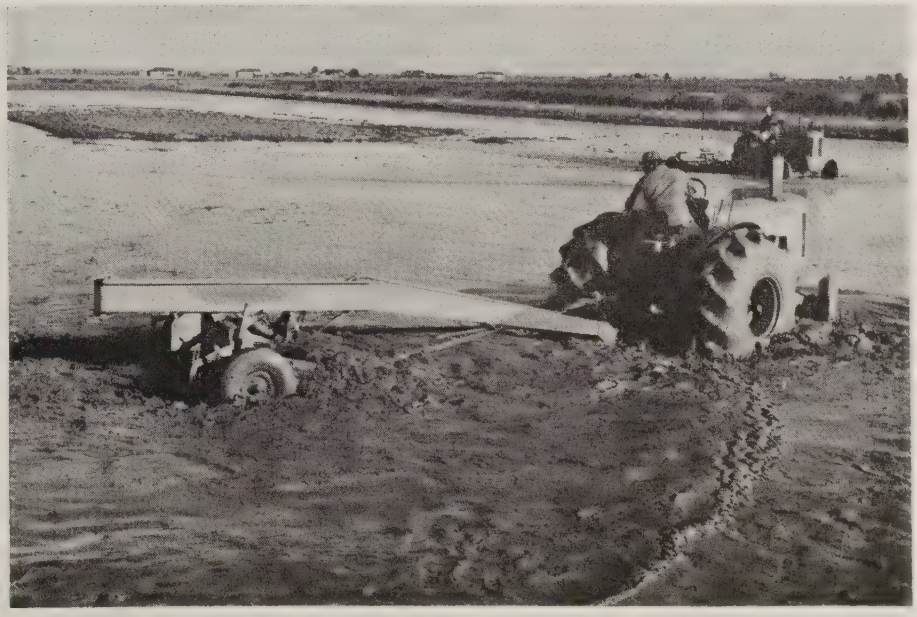
When the job is done properly, it not only provides for efficient removal of surplus water; it prepares the field for irrigation.

Although there is no irrigation on the Hollybrook Plantation, Robert Amacker, one of the owners, says they are making plans to irrigate next year.

"To land grade and square up the field for complete water management—both drainage and irrigation—is the only way to farm," said Amacker.

The goal of this Mississippi

Shallow water over a ricefield shows up the high spots which are then eliminated by the operator. This method of land leveling is gaining popularity.



Precision land grading on this 59-acre ricefield moved 426 cubic yards an acre, built parallel levees, and created an irrigation fall of 0.15 foot a 100 feet.

River bottom-land plantation is complete water management. Simple drainage isn't enough on this farm and on 8 million acres of river bottom, terrace, and Gulf Coast Prairie flat farmlands in Louisiana. It is only half a loaf in the bread and butter management of such land in this day of large farm machinery and narrow margins between costs and returns.

Similar results were obtained by the water-leveling method by Harry Aquillard, rice and cattle farmer of Basile in the Grand Coteau Ridge Soil and Water Conservation District. He reduced labor costs of flooding ricefields by 50 percent or more.

"I now use two men where five were formerly needed," said Aquillard. "I save 25 to 30 percent of the water that I once used, and I get a better stand of rice. Better water control results in better yields."

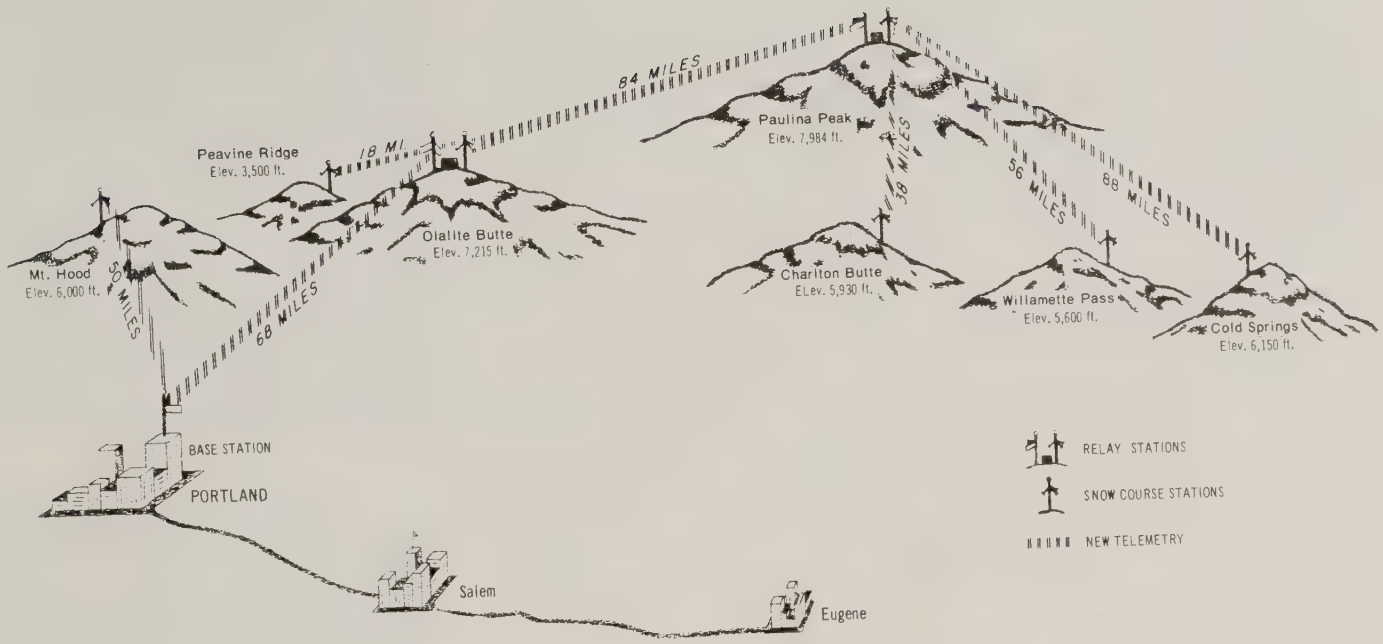
His levees are in grass and do not break following heavy rains. The grass holds down weeds which formerly infiltrated into the rice.

J. A. (Pete) DeKeyzer, chairman of the Lower West Red River Soil and Water Conservation District, is installing a complete water-management system on his farm in the Bayou Rapides Watershed Project near Alexandria. His system includes land grading, surface drainage ditches, main underground irrigation pipelines and portable gated pipe, and the necessary erosion-control structures.

With a modernized water-management system he says, "I will be able to farm like I have always wanted to."

And so the story goes all across Louisiana as conservation district cooperators are discarding old and inefficient methods of water control for up-to-date systems of water management. They are no longer satisfied with a half a loaf. ♦

A landplane finishes up a grading job in the Lower West Red River Soil and Water Conservation District.



The Cascade Range snow survey telemetry system.

Electronic Methods of Snow Surveying

By William G. Shannon
Chief, Water Supply Forecasting Branch, SCS

A SOIL conservation technician sitting in an office in Portland, Oreg., can tell you whether it has snowed in the past hour, what the air temperature is, and how much water is in the snowpack on Mt. Hood 50 miles away. The information comes automatically by radio every hour from a snow course on the mountain.

With new equipment now being installed at other points in the Cascade mountains, the SCS Water Supply Forecasting Office in Portland will be kept currently posted on these and other conditions at strategic points as far away as Cold Springs, Oreg., a distance of 240 miles.

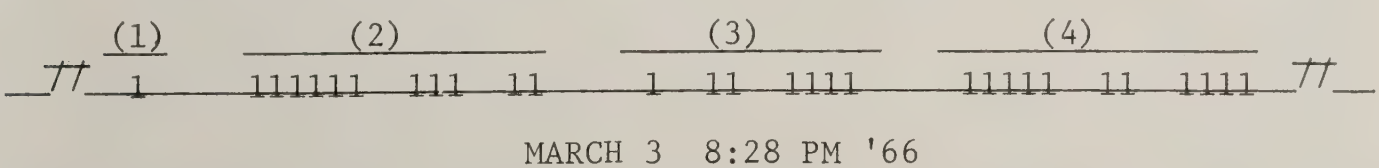
The readings of basic data are made automatically by instruments installed at the observation points, automatically encoded and transmitted by radio, and decoded at the base station.

To find a way to obtain water-supply forecast information directly from the high mountains, SCS established a testing site several years ago on Mt. Hood. Here a variety of sensoring devices and telemetry components were installed and tested. The system now in operation provides several channels of information automatically by radio to the base station.

The readout is in digital form printed on tape. Local recorders on the mountain make a continuous record of all sensors under study.

By observing the printout on the tape, the office staff can tell at any time what is happening on the mountain. If it is snowing, the tape will show an increase in water content; if the snow is melting, there will be a decrease. Air temperature is also reported so that changes in temperature can be noted. Other parameters, such as wind movement, solar radiation, soil moisture, and soil temperature, also can be collected. All of this information assists the forecaster in understanding the relationships between these factors and the runoff.

The device presently being tested to determine the water equivalent of snow is a rubber or rubber-



Typical information printed on a tape by the readout device is translated as follows: (1) Code number for Mt. Hood station, (2) 63.2 inches of preciptiation, (3) 12.4 degrees of air temperature, (4) 52.4 inches water equivalent in the snow cover.

impregnated fabric pillow. Other materials can be used.

A solution of antifreeze is put into the pillow. The ground is leveled at the data-collection site so that the pillow will lie flat. A pressure hose is attached, and as the snow accumulates, the weight exerts a pressure. The change in pressure is proportional to the increase in inches of water accumulation on the pillow.

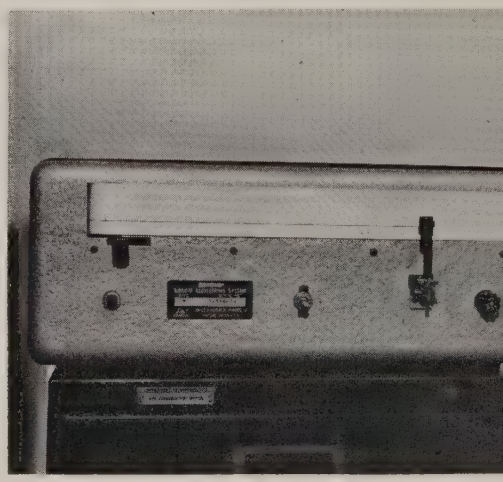
Experimentation with different sizes and shapes shows that a 6-foot pillow having a round or polygonal shape provides good results in shallow to medium depths of snow. In the heavy snow areas and where quick response to snowfall is required, a larger pillow gives better results.

A completely automatic collection and telemetry system, of course, is complex. This complexity is compounded by severe weather and temperature conditions and the need for a power source at the remote mountain sites. The system also has to be reliable, easy to maintain, and low in cost.

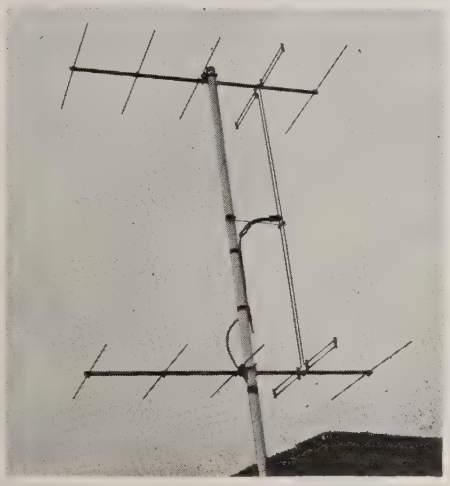
The Soil Conservation Service operates, by telemetry, segments of a network in several States. The equipment used in the operation represents prototypes of several systems. These have been developed and installed under agreements and contracts with commercial companies and universities. Sufficient experience and operational records have been obtained to begin selection of a particular system and mode of operation to most fully satisfy the needs for collecting snow and related data.

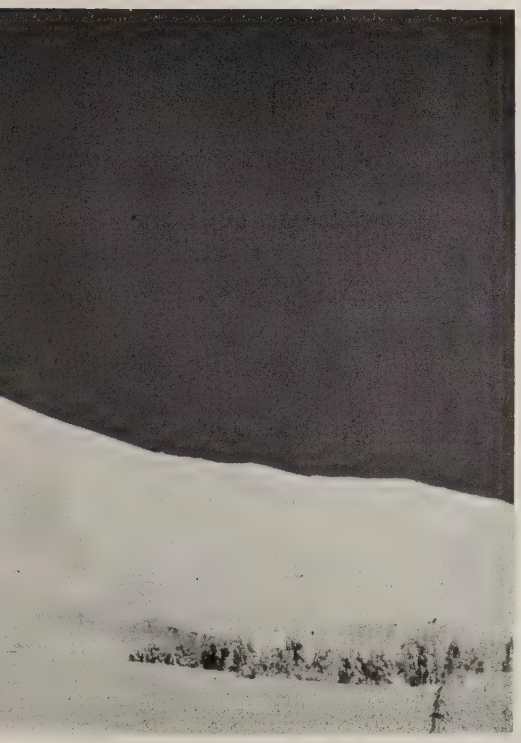
The Service plans to have in operation, for the 1967 snow season, the system which is illustrated in the accompanying sketch.

This installation will collect data from key snow-course locations along the Cascade Range in Oregon. Data can be collected at any time interval which is pre-set at the base station. The snow courses



A 12-foot-diameter snow pillow (above) being installed at the Mt. Hood, Oreg., test site is positioned on a smooth base. At the base station, a readout device ('eft center) indicates the water equivalent of the snow by a sequence of marks on the tape. The antenna (right center) at the base station receives data from the Mt. Hood experimental site and other snow courses in Oregon.





Laborious manual measurements of snow on remote courses (upper right) will be replaced by continuous automatic data collection at stations such as the one at Garden City Summit, Utah (lower).

can be interrogated in sequence or on a selected basis if desired.

The incoming information will be printed on a hand copy and punched on tape. The tape can be processed through computer equipment for tabulation and computations. This will eliminate the need for manual processing.

Other SCS telemetry systems operating in Montana and Idaho provide information to base stations where it is transcribed by a recorder onto a chart. The information is then taken from the chart by observation and processed manually.

SCS has an agreement with the Bureau of Reclamation to undertake the measurement of snow accumulation in the Park Range area near Steamboat Springs, Colo., in connection with the Bureau's Atmospheric Water Resources Program. That network has 21 snow courses. Twelve courses are located along the Continental Divide. Six of the key stations will be equipped with pressure pillows, onsite recorders, and radio telemetry equipment. Data will be transmitted via a repeater station to the base station located in Steamboat Springs. This system will be in full operation during the 1967 snow season.

The new electronic methods should prove helpful in obtaining more frequent information, additional parameters, and better coverage of the more remote mountain areas. ♦

Camping-Fishing Area Solves Trespass Problem

FISHERMEN en route to the Boulder River for angling were a problem for Duane Hooper on his farm 3 miles south of Big Timber, Mont. They consistently went across his front yard.

Hooper solved the problem and capitalized on his location on the river which flows past his farmstead. He installed the Spring Creek camping area.

Hooper also had visions of fish ponds where those who were unsuccessful in the river could catch and take home a presentable creel of fish.

In January 1963, he contacted the Sweet Grass County Soil Conservation District for assistance. Planning was started immediately, and construction of the ponds began in the spring.

Three ponds creating 2 acres of fishing waters were planned and built in the spring, one to hold the "trophy" trout.

After the ponds were completed, the camping areas were developed: Parking areas, picnic tables, fireplaces, electricity, and restroom facilities.

On May 19, when the regular fishing season opened, Duane Hooper had his commercial fish and license, his ponds stocked with 6,000 legal-sized fish, and was ready for business. The first day of the season he sold more than 100 fish, on a per-inch basis.

The number of fishermen willing to pay for fishing was a surprise to planners as well as to Hooper. There was no other fishing enterprise close by to judge the interest of fishermen who might pay for what they caught in this fabulous angling country where fishing was always "for free."

During the first year, more than 500 people camped at Spring Creek Campground. Most of the fish sold were to nonresidents—tourists traveling through the State who would rather pay for the trout they caught than buy a nonresident license. When fishing in the river, they had to take their chances.

Duane Hooper's commercial fish pond and combined office and store built as part of an income-producing recreation enterprise.

During the next winter, Hooper improved the campgrounds, putting in showers and a sewerage system for self-contained camping trailers. He also installed an office where he sells fishing tackle, bait, candy, ice cream, ice, and other fisherman and camper needs. A "gimmick" was installed where the kids can secure either a penny or a nickel's worth of food, and then feed the fish.

The 1964 season brought more than 5,000 people from 33 States and 3 foreign countries to the campgrounds. Further improvements were made in 1964, and more than 8,000 people camped at Spring Creek Campground in 1965.

To make further use of the water and ponds, 20,000 4-inch fish were purchased in the fall of 1964. These were raised to catchable size for the 1965 season and were available to customers for stocking private ponds.

Preparing for the 1966 season, Hooper purchased 23,000 4-inch fish and had those for sale as "catchables" to stock other ponds.

This recreation area is serving a need for many campers desiring an overnight or longer camping place and a place for tourists to catch fish without the need of a nonresident license. Most people stop because of signs placed along the highway on both sides of Big Timber. The purchases of 8,000 campers requiring groceries, gas, and other daily necessities are sizable expenditures in the town of Big Timber.—LOUIS M. MOOS, *Biologist, SCS, Bozeman, Mont.* ♦

Fewer Acres Burned by Forest Fires

Acreage burned by forest fires hit an all-time low in 1965, although number of fires decreased only slightly. A total of 2,652,842 acres, an area about twice the size of Delaware, burned, according to the U. S. Forest Service. This figure is a reduction of almost 37 percent from 1964 and is 383,377 acres less than the previous low in 1961. ♦

What About Farm Drainage?

By Gladwin E. Young, *Associate Administrator, SCS*

FOR MANY YEARS I have had a hand in problems of agricultural drainage in the Department of Agriculture.

Almost 50 years ago, as an Indiana farm boy, I dug the ditch and laid the last 20 rods of draintile that completed the drainage on my father's farm. My father used to tell me that the value of crops lost before that ditch was installed was enough to send me to school.

In those days, the same as now, a farmer couldn't afford to lose a crop by having it drown out.

Purposes of drainage

In recent years drainage of farmlands has become a controversial issue between waterfowl hunters and farmers. The Soil Conservation Service is involved because of the assigned responsibilities to assist land owners and operators make productive use of land and water resources.

The facts about agricultural drainage show that mostly it has been good—but not always so. Drainage is one of the creative technologies of American farmers that have made American agriculture the most efficient and productive in the world.

I am afraid most people in America do not realize how important this is. A productive and efficient agriculture is the real foundation for economic growth and strength in this country or in any other nation.

We have been experiencing abundant low-cost food in this country for a long time. This cheap food era will not last forever.

The attitude that productive farmland is surplus to the Nation's needs is due for a change. At the Pan American Soil Conservation Congress in Brazil, Secretary Freeman sounded this warning:

"The greatest single challenge the world faces today is whether the swelling ranks of mankind can produce enough food to sustain life without hunger."

We have about 457 million acres of cropland in the United States. About one-third, or about 150 million acres, is drained to make it fully productive. Only about 50 or 60 million acres of our present cropland was originally swampland.

Most of the farm drainage has been installed to remove excess water during wet seasons. Some investments in drainage enterprises did not pay off because of poor soils, bad engineering, or costly speculation. And wildlife values were lost or radically changed with the drainage of swamps.

On the other side of the scale, of course, drainage of swamps permitted settlement of some of the most productive and valuable land in the country.

By 1930 about 80 percent of the land now in drainage projects was already drained. The projects were installed under State drainage laws.

Federal assistance

Prior to the Public Works Program of the 1930's the Federal Government had not participated in direct land drainage except to provide research results and limited technical advice. Since then the Congress has authorized drainage assistance as an interrelated part of the nationwide program of water-resource development. The Departments of Agriculture, Army, and Interior all include drainage as an integral part of water- and related land-resource projects.

It is estimated that 20 million acres of wetland can still be developed as farmland. Roughly 7 million acres of this is found in the bottom lands of the Mississippi River in Arkansas, Mississippi, and Louisiana. Another 7 or 8 million acres is scattered in the Coastal Plains of the Southeast.

At least 75 million acres of undrained wetland in the United States is not suited for farming but should be used for wildlife, hardwood timber, and recreation.

A public concern

The Soil Conservation Service believes that it is important that technical assistance be continued for those seeking to rehabilitate old drainage systems. It is also important that those seeking to install new drainage should seek professional advice from wildlife biologists, soil scientists, and agricultural engineers.

The fact that not all wetlands would be productive farmlands if they were drained makes selection of land and design of drainage systems important public concerns. Drainage that brings new land into crop production is not now in the public interest, therefore it continues to be the policy of the Department of Agriculture that public funds shall not to be used to provide assistance for this purpose.

Draining poor land or improper drainage installations results in losses to individuals and to public values as well. Wildlife habitat can be ruined with no offsetting gain.

For many private owners, income from wildlife can offer greater net gain than agricultural uses. This is a potential use of land that needs greater promotion by soil conservation districts and the SCS professional staff.

Value to wildlife

Drainage is not always detrimental to wildlife production. This has been demonstrated many times in the management of wildlife refuges. Drainage is necessary to make it possible to have water at the right place at the right time. This is as important to wildlife managers as it is to farmers.

Rehabilitation of some existing drainage systems will no doubt go on and should go forward to prevent waste and loss to individuals and communities. Some drainage of land not now developed will probably be inevitable. But in terms of the net acreage, drainage projects in the next decade or so are not likely to go very much above the 102 million acres shown in the censuses of 1960 and 1950. It is my prediction that about as much area will go out of drainage as is brought in.

If this is true, there will continue to be some differences of judgments and interests about what lands should be drained. But we have substantial demonstrations that reasonable solutions to conflicts can be found by reasonable men.

Farmers on whose land wildlife feeds and nests should find compensation from those of us who like to hunt. Not enough ingenuity has yet been used to find workable systems that must inevitably be found to increase productive wildlife habitat. We must have efficient farming and we need wildlife. They can exist side-by-side if we apply the skills and information now available.

Reasonable solutions

The policies and programs now in force in the prairie pothole country, I think, are good examples of working toward reasonable solutions. There has been a controversy that seemed to brand everyone who spoke in favor of ducks as being against farmers, and those who spoke in favor of farmers as being enemies of ducks.

That situation has now been improved by action of Congress that provided cash benefits to farmers through Federal purchase or lease of wetlands and at the same time made drainage ineligible for cost-sharing under certain circumstances.

These actions, while helpful, are not likely to make an immediate difference in waterfowl numbers. The reason is that the variation in production of ducks, like other farm crops in the prairie pothole region, is affected more by rainfall than by any other factor.

Discontinuing drainage will not stabilize the waterfowl population. This has been established by data collected by the Bureau of Sport Fisheries and Wildlife and is recognized by the International Migratory Bird Committee.

Wildlife technology

The technologies of farming have been developed to minimize the hazards of weather—to have water at the right place at the right time. Drainage, irrigation, farm ponds, terracing, and watershed projects are a few such practices. Similar principles of land and water management for wildlife are going to have to be found and applied.

Management of resources has been necessary because nature without the stewardship and ingenuity of man has rarely been productive enough to support mankind.

Beef cattle produce more meat from the range than did the buffalo. Farm ponds are producing more fishing per acre-foot of water than natural waters. Managed forest lands produce more wood products than unmanaged lands. Crop yields per acre are now increasing at the rate of 25 percent in a decade—all because man has directed his mind and investments to attaining these results.

This raises a question of what could be expected from wildlife if the same ingenuity and technology were directed toward adaptation of wild species to new habitats and the modification of habitat to adaptable species. New ways need to be found to increase yields of wildlife comparable to yields of other products of land and water.

Part of the answers to these questions are already available from wildlife research and wildlife managers. But it seems to me that those responsible for professional leadership in natural resources should do even more to help the general public to understand that plentiful wildlife is not going to result merely from leaving nature alone.

Leaving nature alone would not have provided ringneck pheasant shooting. It wouldn't have brought back wild turkeys and deer where they had not been for generations. It won't put water where we need it when we need it. I am sure it would not feed a Nation of 195 million people.

There needs to be a positive program of water and land management for waterfowl the same as there needs to be a positive water and land management program for agriculture.

Summary

Agricultural drainage is one of the technologies that, when properly used with other practices, has made America's agriculture productive and efficient. While some additional drainage will no doubt take place, other drainage projects may be abandoned so that the prospect is for no great net expansion in drained areas in the immediate years ahead.

A program of "no drainage" is not adequate to assure stability of waterfowl populations. A positive program of water management for wildlife is needed just as it is necessary for agricultural production. A program that will give greater participation of landowners in benefits from wildlife is imperative.

There is a continuing need for professional assistance from engi-

neers, soil scientists, and wildlife biologists to guide those who make decisions about investments in new drainage—but particularly in rehabilitation and maintenance of the 100 million acres in old drainage projects. Individuals who own land will continue to make the decisions, but the public has a stake in them.

While farm surpluses are shrinking and food is taking on new dimensions in the light of our own growing population, and in the light of aid to developing nations, we still have land enough to meet the foreseeable needs. At the same time, we have land and water enough so we can afford to devote substantial areas to wildlife and recreation. But we can afford this only if we continue to improve and apply more science and technologies to resource management. ♦

Stripcropping Pleases Farmers

"IT IS conservation farming, free, with dividends," according to Leo Simpson, chairman of the Christian County Soil Conservation District near the Kentucky-Tennessee State line.

He is speaking of contour stripcropping, which in the past 10 years has become a popular conservation practice.

The county's first contour stripcropping took shape on a 426-acre farm owned by John Knight. His conservation farm plan, prepared in 1955, included 200 acres of stripcropping and 7 acres of grassed waterways.

This was the beginning of a new era of farming in Christian County—the largest agricultural county in Kentucky.

In 1965, 8,691 acres were stripcropped, according to Ray Hutchens, SCS work unit conservationist. About 1,000 acres are being added annually.—WILLIAM C. LOWRY, *Soil Conservationist, SCS, Madisonville, Ky.* ♦

"Grass Gages" Give Ranchers Clues to Proper Grazing Rates

"GRASS GAGES" are what ranchers of the Eldorado-Divide Soil and Water Conservation District in Texas call the movable wire cages SCS range conservationists have shown them how to install in their pastures.

The cages serve to protect small plots of range grass from grazing, enabling the rancher to see how much growth has been made during the season and adjust the stocking of pastures to match forage production.

"They substitute facts for opinion," says T. R. Spence, a cooperator who pioneered their use. "I want one or two in every pasture."

The cages are made of a piece of net wire about 15 feet long. The ends of a piece are tied together and the top is folded in or covered with another short panel of wire. The cages are placed on key range sites or areas in each pasture, generally near roads where they are readily observed. A can or stick is tied on top so they can be easily spotted from a distance.

Conservation of rangeland is achieved primarily by managing the amount and time of grazing so that range vegetation can improve. Wire cages are a visual aid to help stockmen learn the facts about forage plant growth.

Some of the items which the rancher and conservationist can observe and study together more effectively where cages are used are: (1) Ungrazed plants useful as a standard for comparison of grazed plants on the site; (2) the length of leaf growth and number of seed stalks produced; (3) accumulation of mulch; (4) evidence of spread or increase of the better species; (5) depth of moisture penetration in the soil; (6) preferences of livestock for different plants; (7) evidences of soil erosion and control. A close study of these items generally helps the rancher to make management decisions with clarity of purpose and understanding.

Usually two cages are placed on the key site or area in each pasture. One cage can be left in the same place for more than 1 year, and the other moved occasionally to give short-term samples of growth—WILLIAM M. ROUNTREE, CURTIS J. FAWCETT, AND LLOYD B. JOHNSON, *Work Unit Conservationist, SCS, Eldorado; Range Conservationist, SCS, Laredo, and Soil Conservation Technician, SCS, Eldorado, Tex.* ♦

Ranchman Peyton Cain and SCS Conservationist Bill Rountree study the facts together with the help of a "grass gage."

Eight More RC&D Projects Approved

ECONOMIC development in communities of Tennessee, Mississippi, Illinois, Louisiana, New York, South Carolina, Texas, and Utah will be accelerated through Federal assistance, recently authorized by the Secretary of Agriculture, to local sponsors of the Resource Conservation and Development projects.

The 8 new RC&D projects bring to 26 the total number authorized for assistance in operations.

Southeast Delta, Miss.

Sponsored by the Humphreys, Leflore, Sunflower, Carroll, Holmes, and Yazoo County soil and water conservation districts, as well as the Big Sand Creek District and other organizations, the Southeast Delta RC&D Project occupies 1,474,166 acres.

It plans to prevent floods; improve irrigation water use, drainage, and woodland management; develop recreational resources; improve rural housing; renovate land damaged by sediment; provide conservation treatment of farmlands; and accelerate technical assistance.

Proposed measures include improvement of navigation on the Yazoo River; sewage treatment at Tchula, Belzoni, Schlater, Morgan City, and Drew; garbage disposal and improved streets at Tchula; park developments at Tchula and Minter City; a tourist potential survey for Humphreys County; a comprehensive development plan for Isola; industrial park developments at Belzoni and Drew; an industrial potential study and a beautification project at Belzoni; and an airport development.

The project measures are expected to deliver an economic impact yielding several million dollars of additional income annually throughout the 10-year installation period, creating thousands of new jobs to further enhance the well-being of the local economy.

Hull-York Lakeland, Tenn.

Located in Clay, Dekalb, Fentress, Jackson, Macon, Overton, Pickett, Putnam, Smith, White, and Cumberland counties, the Hull-York Lakeland RC&D Project covers 2,578,480 acres. It is sponsored by the soil conservation districts and other organizations in the 11 counties.

Some of the objectives are to accelerate land use and treatment; install community- and group-type improvements for flood prevention, sediment control, and agricultural water management; improve management and use of privately owned woodland; establish and improve public and private recreational developments; encourage the building of a pulp mill and factories; improve and strengthen family farms and community services; expand processing and marketing of selected mineral resources; expand and improve the system of primary and secondary highways and roads; and improve and expand community facilities —water supply, sewage, and others.

Shawnee, Ill.

The Shawnee RC&D Project covers 2,596,000 acres in Alexander, Gallatin, Hardin, Jackson, Johnson, Massac, Pope, Pulaski, Saline, Union, and Williamson counties plus parts of Franklin, Hamilton, and White counties and is sponsored by the soil and water conservation districts and other organizations of these counties.

Some of the problems are bottomland flooding, severe domestic and argicultural water deficiences, and stream pollution.

The plan is to convert 100,000 acres of steep cropland to pasture, woodland, wildlife, and recreation; develop and coordinate small watershed projects; accelerate soil survey operations; develop recreation potential; initiate research projects on stream pollution; and upgrade basic forest resources.

Bossier-Webster, La.

Covering 11,540,000 acres in Bossier and Webster parishes, the Bossier-Webster RC&D Project is sponsored by the Dorcheat Soil and Water Conservation District and the Bossier and Webster Parish police juries.

Numerous changes in land use, farming conditions, population growth and shifts, additional needs for land and water, and economic and social conditions are some of the problems.

The plan is to accelerate soil surveys and conservation planning; improve forest management; develop adequate water supplies for all purposes; accelerate wildlife development; develop recreation potential; and establish a canning and processing plant.

South Central, N. Y.

Located in the counties of Broome, Chenango, Cortland, Delaware, Madison, Otsego, and Tioga, the South Central RC&D Project is sponsored by the seven soil and water conservation districts and seven county boards of supervisors. It is 3,702,470 acres in area.

Problems of water management, water quality, water storage, and flood control are being aggravated by increasing population and rapid changes in land use. Farm incomes are low.

It is proposed to intensify and coordinate both immediate and long range land use planning; fully develop and utilize water resources; accelerate land conservation treat-

ment to reduce erosion, flooding, and sedimentation; provide job training opportunities; and complete soil surveys for the area.

Lowcountry, S. C.

Encompassing an area of 3,143,680 acres in Beaufort, Berkeley, Charleston, Colleton, Dorchester, and Jasper counties, the Lowcountry Area RC&D Project is sponsored by five soil and water conservation districts and other organizations.

Health problems are acute, the majority of rural homes lack running water, and the low terrain and heavy rainfall contribute to problems of flooding, water management, and water control.

Among the proposals are the encouragement of adequate size family agricultural units; acceleration of needed conservation measures; provision of proper and adequate water control; promotion of recreation and tourist developments; and improvement of management of the area's woodlands.

Southeast Texas

The Southeast Texas RC&D Project covers 5,233,000 acres in Orange, Jasper, Newton, Jefferson, Hardin, Tyler, Polk, and Chambers counties and parts of Liberty and San Jacinto counties.

Eight soil conservation districts and other organizations sponsored the project.

It is planned to improve land use and treatment; diversify farm enterprises; coordinate efforts in developing natural resource use; develop potential for both public and private outdoor recreation areas; and accelerate soil survey operations.

Box Elder, Utah

The Box Elder RC&D Project has an area of 3,474,696 acres and is sponsored by three soil conservation districts and other organizations in Box Elder County.

Major problems include irrigation water shortages and water losses, flood damage, lack of marketing facilities, and job opportunities.

Some of the proposals are to conduct a complete soil survey; develop irrigation water-storage facilities; improve irrigation water-conveyance systems; accelerate needed conservation measures on farms and ranches; develop small income-producing recreation areas; and halt flooding. ♦

FFA Members in Contest

FORTY-FIVE Negro FFA chapter members competed last spring in the Area VI land-judging contest at Mt. Pleasant, Tex., sponsored by the Sulphur-Cypress Soil and Water Conservation District. Not only was this the first year Negroes competed in the annual contests, but it also was the biggest contest ever held in the district.

District officials thought the contest an outstanding success. Of the top 5 teams competing, 4 later placed in the top 5 in Texas, and 2 finished in the top 10 at the International Contest at Oklahoma City.

"Although there were no Negroes on the top five teams, the Negro contestants learned a lot in competing against such top flight, experienced competition," reports Rayburn Nash, area conservationist, SCS, Mt. Pleasant. "Just think—2 of the top 10 teams in the Nation competed here. We're expecting the Negro members to be in the thick of the contest from now on."

Credit for part of the contest's success goes to Miles I. Hall, then a soil scientist, and Irvin Musgrove, Negro soil conservationist. They contacted all FFA advisers several years ago, offering to help with land-judging training. Additional training of teachers and coaches this year is expected to help them produce winners in the future. ♦

Some of the contestants at the land-judging contest at Mt. Pleasant, Tex.

CONSERVATION PROFILE

Ray Hecksel

Minnesota

Conservationist's farm "viewed" by thousands

SAY WHAT YOU WILL, conservation sells best when you can see it on the land. The neighbors of Ray Hecksel, Watertown, Minn., farmer, have appreciated this fact for years.

Almost as good as being there, though, is an aerial photo overlooking Oak Lake on Hecksel's farm that is making an impact on hundreds of thousands of admiring viewers.

In 1960, Erwin Cole, SCS photographer, took an aerial photo of the contour strips on the farm. This picture later represented Minnesota in the "Water for America" exhibit, and an earlier view of the Hecksel farm was used in the National Association of Soil and Water Conservation District's 1966 Soil Stewardship booklet and in its "Heritage of a Free People" publication.

These are pictures of a farm seen by hundreds of thousands—but what about the man behind the farm, Ray Hecksel?

His story starts almost 30 years ago when in 1939 he rented this farm in Carver County.

The farm had been cropped in big, square fields for years. After each heavy rain, runoff water cut small gullies across the fields.

"I remember growing sweet corn one year when rains were heavy," Hecksel recalls. "That fall we had trouble. Wheels of the trucks dropped to their axles in the small washouts. Digging out those big, heavily loaded trucks was hard work. Grain harvests were a problem too. I carried a shovel on the binder and had to stop several times on some rounds, get the shovel out, and fill in the gullies and washouts to get the binder bullwheel across. Soil erosion was hard on the machinery as well as on me. Besides it cost money in reduced crop yields."

In spite of these problems, Ray bought the farm in 1943. During 2 of the next 4 years rains were unusually heavy, eroding the soil and developing field washouts that he couldn't cross. By 1947, Hecksel was ready to move off. Let somebody else have the troubles!

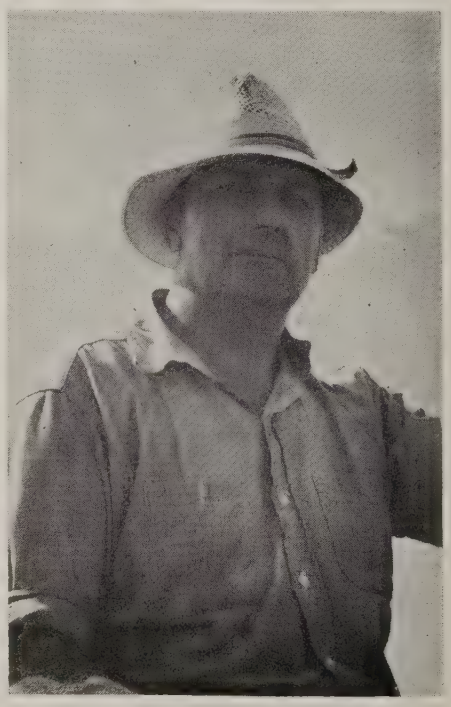
Original supervisor

But just at that time Walter Lobitz, one of the original supervisors of the Carver Soil and Water Conservation District, proposed that Ray get a group of neighboring farmers together for a meeting to discuss conservation plans and practices.

The next January Hecksel told Ed Lyons, SCS soil conservationist at Waconia, that several interested neighboring farmers planned to meet in the rural St. Peter's Lutheran Church basement near Watertown.

The night was a bad one with

Right—Ray Hecksel. Left—Aerial photo of contour strips on the Hecksel farm represented Minnesota in the "Water for America" exhibit.



a 20°-below zero temperature, high winds, and drifting snow. Because of the storm only four or five farmers attended, but Lyons explained soil conservation plans and practices to his small audience and told the farmers they could get on-farm assistance with conservation planning and application of the practices.

Erosion control

This was what Ray had been looking for. He signed a request for erosion-control help for 1948.

The next spring changes began to take place on Ray's farm. Lyons and Herb Halverson, also an SCS soil conservationist, staked out the first contour strips and surveyed the gullies to be filled, shaped, and seeded to grassed waterways. This first step would control soil erosion on slopes on the north side of the road facing Old Lake.

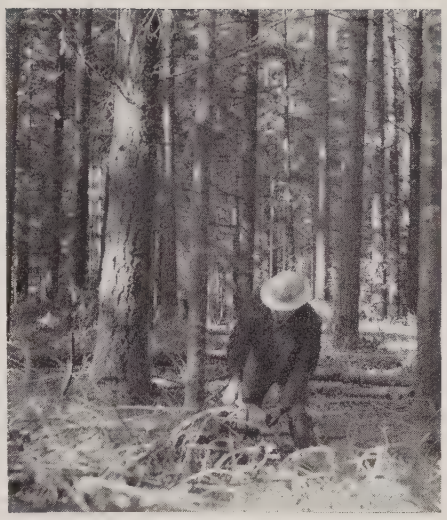
In October 1948, a soil conservation "face lifting" was held on Ray Hecksel's farm and on the adjoining Herb Koehler farm. It was a big affair with about 4,000 people in attendance. The rest of Ray's conservation farm plan was applied during this demonstration.

With soil erosion controlled, his production of corn, grain, and hay quickly climbed in quality and increased in quantity. Wear and tear on machinery was reduced—so was the wear and tear on Ray.

This is by no means the end of the story. Hecksel has continued to apply needed practices on his farm until it is now a top conservation farm in the community.

Recognized as a conservation leader, Ray was elected to the Carver District board of supervisors in 1950. He was re-elected twice and was board chairman until he retired in March of this year.

Ray Hecksel has practiced what he has preached. He has encouraged others to follow a good soil and water conservation program and has set an example on his own land. ♦



Thinning of this Douglas fir stand returned the owner, V. T. Haapala, $100 an acre.

Woodland Plan Brings Profit

GOOD woodland management is already paying off for V. T. Haapala, who farms near Winlock, Wash.

Haapala, cooperator of the Lewis County Soil and Water Conservation District, has netted nearly $100 an acre from timber for sawlogs, poles, and pilings that he has thinned out of part of his woodland. And this was just the first step under his woodland plan developed with SCS help.

His 310 acres of woodland includes 25- to 40-year-old Douglas fir and red alder. He divided 240 acres into six units of about 40 acres each; each year one unit is thinned and improved. He's now working on unit 1.

The other 70 woodland acres are treated separately. He will harvest red alder from two fields in the next 15 to 20 years, and then plant the fields to Douglas fir. Christmas trees will be cultured and harvested on three other fields; two fields soon will be planted to Douglas fir; and so on. The rest of the 371-acre farm is cropland.

Haapala hopes to do an increasing percentage of the harvesting himself as time goes on. In helping with the thinning so far he has realized the value of good roads and correct positioning of landings, and his plans include road straightening and widening and building of new ones.—DAVID L. HINTZ, *Forester, SCS, Chehalis, Wash.* ♦

Economic Act Helps Farmer

THE ECONOMIC Opportunity Act's College Work Study Program is not only helping worthy students through school but is making a real contribution to Maine's soil and water conservation program. Tyler Libby, University of Maine student, is a good example.

Tyler lives on a small general farm with his widowed mother, Mrs. Elsie Libby, and three brothers. Last year she helped Tyler and his older brother attend the University of Maine.

Mrs. Libby with the help of her 4 sons manages 12 small backwoods sporting camps on Millinocket, Caribou, and Chandler lakes. Mrs. Libby's gross income, less than $3,000 a year, was just not enough to meet education expenses.

Libby has to work his way through college. He overcame some of his financial difficulties by working in Maine's small watershed program.

The University of Maine under the Economic Opportunity Act sponsored Tyler and 13 other students, and the Maine Soil and Water Conservation Committee placed the students in soil and water conservation districts where they received good working experience and made a contribution in the field of conservation. SCS provided on-the-job training.

The students worked as typists, clerks, rodmen, map makers, or they generally assisted SCS personnel in engineering investigations.

Tyler helped survey watershed damsites. "Jacking" rod, chaining

distances, and staking grades were new experiences for him. Working with soil conservationists also helped in understanding the problems, needs, and programs of soil and water conservation.

Equally important, the 10 weeks of summer employment meant nearly $700 to help defray school expenses.—LAUREN H. LONG, *Assistant to State Conservationist, SCS, Orono, Maine.* ♦

Notes on Western Range Forbs, Cruciferae through Compositae. BY F. J. HERMANN. *USDA Agr. Hbk. 293. 365 pp., illus. $1.50.*

This book is the second of two parts of an account of western forbs conceived and largely carried out by the late William A. Dayton, who completed the first part, *Equisetaceae through Fumariaceae,* (Agr. Hbk. 161, 1960).

A forb is defined by the American Society of Range Management as "any herbaceous plan other than those in the Gramineae (Grass), Cyperaceae (Sedge), and Juncaceae (Rush) families."

Forbs are very important in conservation work—not only as livestock forage, but as food and forage for wildlife, for erosion control, and for their contribution to natural beauty. It is among the forb plants that we find the "posies" or wild flowers which decorate the countryside and catch the eye of our city friends.

Hermann's booklet includes line drawings and botancial information on each plant discussed. In addition, forage values and poisonous characteristics, if any, are covered. Information on general habitat, range, and other ecological notes are added.

Although written largely for ranchers, range conservationists, and land managers, the books contain much of interest to general conservationists or any lover of the outdoors. They should be on every western conservationist's bookshelf.—ROBERT E. WILLIAMS, *Head Range Conservationist, SCS.*

New Publications

A Ten-Year Program of Federal Water Resources Research. BY FEDERAL COUNCIL FOR SCIENCE AND TECHNOLOGY, COMMITTEE ON WATER RESOURCES RESEARCH. *1966. Office of Science and Technology. Executive Office of the President. 88 pp. $0.40.* "On the average, for the Nation as a whole, natural water supplies are adequate to support a three-to-five-fold increase in water consumption. This assurance is scant comfort to the water utility of a drought-stricken city in the Northeast, to the farmers of the Southwest where water is perennially in short supply, or to an industrial manager who finds the water flowing by his plant so polluted that it cannot be used. Nevertheless, the fact that there is a margin for increased water use does not say that we need fear catastrophic shortages, provided we anticipate our problems and use wise management in dealing with water development."

This publication sets forth a program of research to meet anticipated water problems. The basis for long-range planing of the research program is outlined in Part One. Part Two is a discussion of 14 major problem areas and specific recommendations pertaining to them. Part Three covers current programs in 44 research subcategories and makes directional recommendations regarding each for the decade ending 1976.

Rain Traps for Intercepting and Storing Water for Livestock. BY C. W. LAURITIZEN AND ARNOLD A. THAYER. *1966. USDA Agr. Inf. Bul. 307. 10 pp., illus. 10¢.* Gives details on planning. locating, preparing the site, and conconstructing a rain trap. In addition to supplying water for livestock, the rain trap can be located to control livestock distribution and thereby improve utilization and managment of grazing.

List of Published Soil Surveys. *1966. USDA, Soil Cons. Serv. 24 pp.* An up-to-date listing.

A Consumer's Guide to USDA Services. *USDA Misc. Pub. 959. Revised 1966. 49 pp., illus. 20¢.*

Light and Plants—A Series of Experiments Demonstrating Light Effects on Seed Germination, Plant Growth, and Plant Development. BY R. J. DOWNS, H. A. BORTHWICK, AND A. A. PIRINGER. *1966. USDA Misc. Pub. 879. 17 pp.* Prepared to answer inquiries from students, teachers, and other interested biologists for details of simple but dramatic experiments to demonstrate the formative effects of light on plants.

Farm Costs and Returns. *Revised 1966. USDA Agr. Inf. Bul. 230. 99 pp., illus.* Contains summary estimates of costs and returns for 1965 and earlier years on 42 important types of commercial farms in 24 major farming areas in the United States, together with a brief analysis of changes occurring in production, prices, income, and costs for each of these types of farms.

Facts for Prospective Farmers. BY KENNETH H. MYERS. *1966. USDA Farmers' Bul. 2221. 22 pp., illus. 15¢.* Supersedes Farmers' Bul. 1961. Deals chiefly with the family-managed commercial farm that is large enough for efficient operation.

Methods of Flow Frequency Analysis. *1966. Subcommittee on Hydrology. Inter-Agency Committee on Water Resources, Bul. 13. 42 pp.* Guide to present-day practices in the field of flow frequency analysis.

Beauty for America. *1965. Government Printing Office, Washington, D. C. 782 pp. $2.75.* Proceedings of the White House Conference on Natural Beauty, May 24-25, 1965.

Plant Pests of Importance to North American Agriculture. BY H. H. THORNBERRY. *1966. USDA Agr. Hbk. 307. 446 pp. $2.50.* Index of plant virus diseases.

Effect of Annual Applications of Diuron on Seed Yields of Perennial Grasses in Oregon. BY WILLIAM O. LEE. *1966. USDA Tech. Bul. 1358. 23 pp., illus.*

A Directory of Private Organizations Providing Assistance in Outdoor Recreation to Individuals, Organizations, Public Groups. *1966. U. S. Dept. Interior. 68 pp. 30¢.*

Soil Surveys

Clinton County, Pennsylvania. BY WALTER J. STEPUTIS, RALPH E. MATTICKS, ROBERT ZIMMERMAN, AND ROBERT HENRY. *1966. 141 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

From the Administrator:

Water Conservation and Management

AT A TIME when people are increasingly uneasy about the future of their water supplies—when water is even a topic for international discussion as a possible factor in the prospects of peace—it is well to take stock of what agriculture is doing with the water it controls.

Few people realize what a large share of the Nation's water resource is in the custody of farmers and other rural landowners.

It is common knowledge, of course, that in the irrigated sections of the West as high as 90 percent of streamflow may be used directly in agriculture. The relation of agricultural practices to the amount and quality of water available for competing uses is clear in these situations.

What is not well understood is that in other areas the rural landscape is the *source*, if not the principal consumer, of water.

The condition of the land on which rain and snow fall affects the proportions that soak into the earth immediately and that run off as surface flow. The diversions, terraces, dams, and other water-control devices that land owners use on the uplands and in the small watercourses affect the amount and rate of streamflow; they often make the difference between sudden floods and sustained water yield.

The presence or absence of adequate plant cover and erosion-control measures determines whether the water is clean or silt laden.

So the rural land owners and users are the principal custodians of our water supply, whether they be farmers or exurbanites. Their land-management practices affect us for the good or ill, whether in the dry West where most water falls on public lands in the high mountains and is used on the farms in the valleys or in the humid East where most of the water accumulates on privately owned land and is used by industries and cities.

Another fact about water that is not widely understood is that this is a resource that cannot be increased or diminished. There is only so much water; so far as we know, there always has been and always will be the same amount. Only its quality, its distribution, and the rate at which it moves downslope and downstream toward the sea or evaporates into the air can be altered by our activities.

Water conservation, then, is not a matter of creating new supplies nor of preserving what we already have; it is a matter of *managing* that which comes to us in a predictable pattern through the endless hydrologic cycle of precipitation, runoff, and evaporation. Water conservation is *efficient use* of the resource as it moves on its relentless way through the cycle.

Wise and efficient management of water begins with sound and thorough planning of major river basins.

Here the various needs for water can be identified and evaluated in relation to the available supply. Watershed-protection projects, impoundments, diversions, and other water-control measures can be planned to make the most beneficial use of the supply for all concerned.

Agriculture's interest in such broadscale planning is represented by our participation in river basin investigations under the auspices of the newly created Water Resources Council.

Small watershed projects offer further opportunity to work out specific solutions to local water problems within the framework of broad river basin plans.

On individual farms, and particularly in irrigated areas, land owners and operators can do much to protect water sources and to improve the efficiency of water use.

Soil conservation district cooperators, individually and in groups, have demonstrated that scientifically planned irrigation systems and skillful water management can reduce per-acre water requirements as much as 50 percent from previous levels.

Technical information and assistance provided by the Soil Conservation Service have been a major element in such savings of irrigation water.

One of the first requirements in the proper management of irrigation water is for the operator to know when to irrigate and how much water to apply. Solution of this problem requires a knowledge of the rooting habits of crop plants, the water-holding capacity of the soil, the rate at which plants use water, and related principles of plant physiology. Soil conservationists assisting district cooperators have been able to supply practical guides on these points.

By using water efficiently and doing a good conservation job, irrigators help their communities get maximum benefits from the water supply of each watershed.

This is no small matter, for, nationally, irrigation accounts for nearly half of total water withdrawals and 80 to 90 percent of consumptive use.

Land owners and users everywhere, whether they use water for irrigation or not, make a substantial contribution to good water management by keeping their land in favorable condition to receive and conserve the natural precipitation that recharges our current water supply.

This is water conservation.

D. A. WILLIAMS

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America the Beautiful

America The Beautiful—Idaho WATER FROM MOUNTAIN SNOWMELT IRRIGATES POTATOES
JEFFERSON SOIL CONSERVATION DISTRICT

The "America the Beautiful" photo exhibit—one picture for each State, Puerto Rico, and the Virgin Islands—has been reproduced in full-color lithographs suitable for framing. Prints are available from the Superintendent of Documents for 10 cents each or $5.00 for the complete set. Order blanks can be obtained from local Soil Conservation Service offices and at most post offices.

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JANUARY 1967
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Soil Conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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SOIL CONSERVATION SERVICE U. S. DEPARTMENT OF AGRICULTURE

Changing . . .

There's a ferment in the land, a reordering of resource use that is involving conservationists in new and broader concerns with human welfare.

The Vice President of the United States in our lead article this month (p. 123) shows his personal interest in this aspect of the New Conservation.

The dramatic example he describes of regional cooperation in his Lake States homeland is a pattern for what needs to happen—and is beginning to happen—in other parts of the country.

Teamwork: Community resource planning takes teamwork in many directions. Such teamwork is apparent in reports this month of significant planning efforts.

The executive director of a regional planning agency in Connecticut, Richard B. Erickson, joins with SCS Conservationist Bob Laramy to tell (p. 126) how towns in that State spell out details of resource use within regional framework plans.

And a local team that labored over practical guides for oncoming urbanization of Cato Township in New York—Planning Commission Chairman Neville Mapham and SCS WUC Charles Barnett—coauthor (p. 128) an account of their experiences.

Another work unit conservationist, Martin Kangas, gives us an example (p. 133) of the "broad area planning" that stemmed from the Land and People Conference in the Vice President's own country.

COVER: The rural scene changes as subdivisions move into farmland in Lake County, Ind. Urbanization like this calls for replanning America's landscapes.

Soil Conservation

Devoted to the wise use of land and water resources

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SOIL CONSERVATION is the official organ of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. The printing of this publication was approved by the Bureau of the Budget July 25, 1963.

ORVILLE L. FREEMAN — Secretary of Agriculture
JOHN A. BAKER — Assistant Secretary of Agriculture
DONALD A. WILLIAMS — Administrator, Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service,
U. S. Department of Agriculture, Washington, D. C. 20250

BEN O. OSBORN, Editor
GEORGIE A. KELLER, Production Editor

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Subscription: $1.75 per year, $2.50 foreign. Single copy, 15 cents. Discount of 25 percent on orders of 100 or more sent to same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D. C. 20402.

Regional Cooperation in Conservation

By Honorable Hubert H. Humphrey

AMERICA's landscape is constructively changing as better use is made of our vast resources.

As I travel around our continent, I am impressed not merely by the new look in city and countryside, but also by a new outlook. A heightened interest in improving the quality of life has resulted in unprecedented teamwork which extends across the boundaries of towns and States to entire regions.

The area with which I am most familiar—the north country around Lakes Superior, Michigan, and Huron—is stirring with dramatic cooperation. In a vast 56-million-acre expanse, filled with wonders of natural beauty and still-to-be-realized promise, three States—Minnesota, Wisconsin, and Michigan—are working together to build a sound, fruitful economy. They see the region's vast woodlands and bountiful waters in a broader perspective than ever before.

Time and change

The States that share the region share with other parts of the Nation a common experience—the impact of time and change on the traditional economic structure.

Timber from the area still serves a broad market, but the logging era of a colorful past lingers only in history.

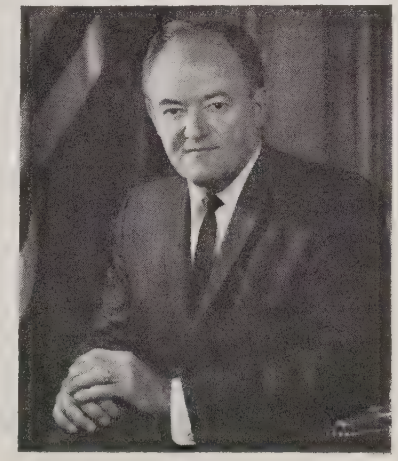
The rich fur trade is but a memory.

The great mining days of iron ore along the Mesabi Range have given way to a new era of taconite.

Depleted as well as new-found resources, new techniques replacing the old, fewer jobs for the miner and woodsman, but more opportunities for new services—these facts tell the story of widespread change in the north country.

Above all, the land and water are still there; so are the hardy and determined people. These priceless resources of the Northern Great Lakes Region are carried over from a vigorous past.

No area as rich in timberland and water as this midwestern northland can remain economically deficient in the heavily populated center of America. The same can be said of many other regions—Appalachia, for example—each of which has a vital place in the national economy and in service of the American people.



Resource action

The future of the Northern Great Lakes Region, like that of other States, lies in the cooperation and dedication of the local people in Resource Conservation and Development programs of broad regional scope and benefit.

The need for joint action was expressed by the governors of Wisconsin, Minnesota, and Michigan following the Land and People Conference at Duluth, which was called by Secretary Freeman in 1963 and addressed by President Kennedy. Since the conference, citizens' groups representing the three States have worked toward greater cooperation in developing the economy of the northern communities.

The tri-State region's 21 million acres of public forest and 24 million acres of private woodland; its 27,000 inland lakes with nearly 3 million acres of surface area; its 3 000 trout streams with more than 15,000 miles of fishable waters; its 23,000 farm ponds; its 2,000 miles of Great Lakes Shoreline; its 1¼ million deer and abundance of

Abundant fishing waters of the Northern Lake States offer quiet outdoor relaxation.

other wildlife—all combine to provide dramatic opportunities for recreational development, and for water supply, wildlife conservation, and economic progress.

Recreation and more

While the stress is on recreational enterprise, the overall theme is diversification—timber production and wood products manufacturing, industrial and municipal power production, and farming and grazing.

Vocational and retraining programs, for both youth and adults, are available in the region. Businessmen and chambers of commerce have organized industrial development funds to help promote new industry. Seventy-six of the 81 counties in the region are participating in the USDA Rural Areas Development effort.

Technical conservation assistance is being extended to nearly 12 000 nonfarm people in the Northern Great Lakes States, through local soil and water conservation districts which are reorienting their programs toward multiple-use resource development. They are partners with more than 146,000 rural cooperators. Their goal is to make every human skill and talent, every acre of land, every gallon of water count for the benefit of the region and the welfare of the people.

Federal assistance, through conservation districts and under various acts of Congress, has effectively pursued this objective as a matter of national interest.

The Water Resources Planning Act, the Economic Opportunity Act, the Public Works and Economic Development Act, and numerous other recent legislative accomplishments of the Congress and the Administration have greatly strengthened the Resource Conservation and Development effort.

Teamwork for success

The effectiveness of Federal participation has been enhanced by the broadening in recent years of the time-honored working relationship between the several States and the Federal Government, so as to include counties, municipalities, and other governmental units. Teamwork with nongovernmental organizations has added to the success of the combined effort.

The West Central Minnesota Resource Conservation and Development Project and the Pri-Ru-Ta RC&D Project in Wisconsin are outstanding examples of this productive local-State-Federal alliance for resource development on a regional basis.

These projects are designed to attack the twin problems of rural underdevelopment and urban overdevelopment. They contribute a sound counterweight to the forces which have generated the trend of country-to-town population movement. They offer hope that migration from our rural areas will give way to rural revival which will attract and retain vital manpower.

For lasting, broad-gaged national

Woodland improvement provides sustained income and better-looking land for Lake States landowners.

growth, we must achieve a balanced approach. We must acknowledge the interdependence of all Americans, and the importance of economic, cultural, and social development in much of what is now rural America, so as to accommodate increased—rather than lessened—numbers outside congested urban centers.

A rural-urban balance

The basic values of the urban and rural community are the same. The needs and aspirations of a people do not change at the corporate limits of a city, or between country folk and city folk.

Rural America requires the advantages of organized community life to enter the mainstream of American progress. There must be available the basic facilities—water, sewers, power, and telephones; adequate roads; schools; hospitals; and other community institutions; and opportunities for employment.

In our urban centers, it must be understood that the city park is as vital as commercial space; the tree-lined neighborhood street as essential as the expanse of freeway. The city that contains the advantages of nature found in the countryside becomes a more complete community.

We are obliged always, in our pursuit of a better way of life, to consider the total environment. Those who plan the use of our outdoor spaces need to understand this first of all.

Some areas of the Nation should be left entirely in their natural state. Such areas are found in the Northern Great Lakes Region, in Appalachia, and in many other parts of the country. These "wilderness" areas have an important place in the future of our country. Some wilderness must be preserved, so that a great natural heritage will not be overrun with what too commonly are considered civilizing influences.

Actually, what might otherwise be considered technical "progress" may eliminate priceless outdoor values which are irreplaceable. Statesmanship requires that we prevent that destruction if we can.

Beauty of improved land and water draws America's families to Lake States for pleasant recreation.

We need awareness

Good conservation is a matter of judgment. Sound laws are only the first step in protecting our resources against the exercise of bad judgment; we must have broad public appreciation of the importance of using our resources wisely.

Improvements in our recent past do provide proof of a new national interest in protecting and enhancing our natural environment by increased cooperation.

Looking back to my 16 years in the Senate, it is deeply gratifying to see how the "seeds" of laws and administration for strengthened, modern conservation have flourished in the "soil" of national understanding.

"A more perfect union" is ahead—the union of people and their land and water resources, the voluntary consensus of private groups, cooperating localities, States, regional groupings, and Federal agencies.

The destiny of town and countryside is linked in a common cause—a fuller life, a still more fruitful, more satisfying future for all our people. ♦

Conservation Sketches Ready for Teachers

Conservation education materials for the elementary grades are now available to teachers in the form of original sketches prepared by the Soil Conservation Service for use with overhead projectors. A total of 115 illustrations divided into 5 packets of 23 line drawings make up the complete set.

Now ready for distribution are three packets, including "The Land That Supports Us," dealing with broad concepts in resource use and conservation; "Our Soil Resources," emphasizing soil conservation principles and practices; and "Our Water Resources," depicting water-resource management practices. Still to be completed for distribution in the spring are "'Our Plant Resources" and "Our Animal Resources." The series is being prepared for sale to schools.

Original drawing to illustrate the various conservation concepts were done by Felix Summers, SCS technical illustrator, with the assistance of subject matter and information specialists. The sketches were then sent to the Minnesota Mining and Manufacturing Company, where the company's technical staff completed the packets. ♦

Plans for More People

Towns in Connecticut map future resource use within framework of regional goals

By Richard B. Erickson and Robert E. Laramy, Jr.
Executive Director, Southeastern Connecticut Regional Planning Agency, Norwich, Conn., and Assistant State Conservationist, SCS, Storrs, Conn.

CAN A STATE expecting a population of more than 1,000 persons for every square mile provide a high-quality living environment for its people?

Resource planners throughout Connecticut are facing this question today and devising new approaches to meet the problems it will pose.

Connecticut is the fourth most densely populated State in the Nation, with an average population density of more than 500 persons per square mile. By the end of the century, the population is expected to double.

To prepare for the problems ahead, Connecticut has evolved a unique planning structure that provides conservation districts and the Soil Conservation Service opportunity to participate at regional as well as local levels.

Statewide planning is coordinated through the Connecticut Interregional Planning Program—a joint effort of the Connecticut Development Commission and the Departments of Agriculture and Natural Resources, Highways, and Finance.

Regional planning is not imposed by the State Government but is initiated by the communities in 15 planning regions defined by the Connecticut Development Commission after careful study of physical, social, and economic factors. There is no county government in Connecticut.

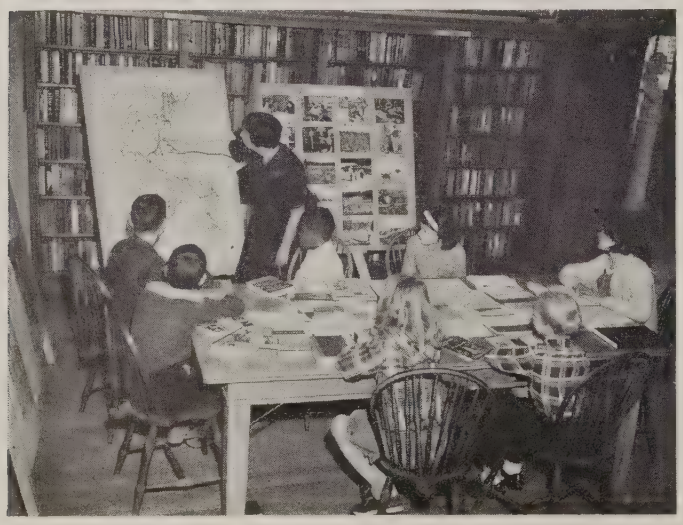
Since 1958, when the first regional planning agency was created, the citizens in 10 regions have voted to form agencies. These now serve 90 percent of the State's population. Each agency is managed by representatives appointed or elected by its member municipalities. Being midway between the local and State levels, the regional agencies are well placed to serve as coordinators of the overall program.

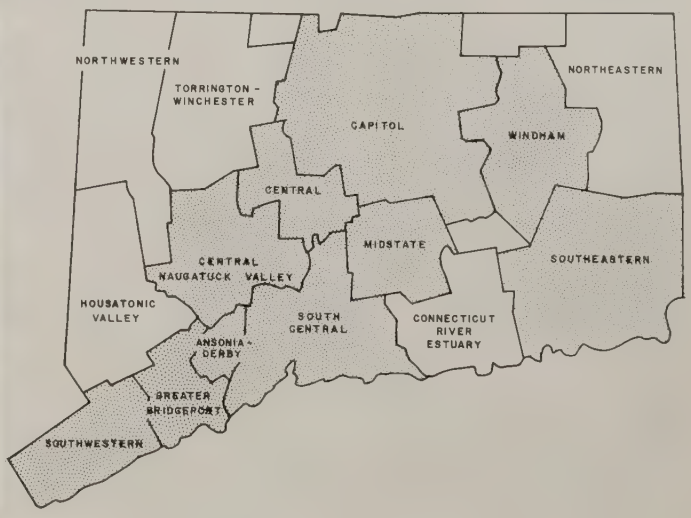
At the local level, municipal and town planning and conservation commissions define local needs and plan natural resource development. The SCS works through soil and water conservation districts to help integrate soil and water conservation into the planning process.

Information provided by SCS on resources helps to answer the question: "How can our limited amounts of land and water best be used to serve the needs of an expanding population?"

Information about the soils and their potentials for different uses was supplied by the SCS through soil conservation districts. Soil maps and interpretations were used to determine the location and extent of prime agricultural land, potential open space and recreation sites, future residential and industrial areas, and for identifying areas that would present problems in onsite sewage disposal, flooding, hillside slippage, and the like. These data are used in analyzing present land use problems and projecting potential land use to meet future population needs.

The land use plan of the town of North Stonington is the subject of study by children in the public schools (left). This town is in the southeastern planning region, 1 of 10 already organized and operating (shaded on map at right). Five others have been defined to complete coverage of the State of Connecticut.





Through text and maps, the regional plan indicates the type of environment the people are striving for and points to ways of achieving the desired objectives. Basically, the plan seeks a sound pattern of land use that minimizes conflicts within communities or between different activities and that provides adequate facilities, such as highways, parks, water supply, and sewage disposal systems.

Within this broad framework, a community can prepare its own plan with understanding of how it fits into the larger region.

Specific projects, whether concerned with urban development or natural resources, can be more closely focused on the area's needs.

For instance, current planning for a watershed-protection project on the flood-prone Yantic River is being closely related to land use and resource proposals of the southeastern regional plan.

On a broader scale, regional planning has led to an application for a Resource Conservation and Development Project for the State's three eastern planning regions, about 900,000 acres.

Activities in North Stonington, 1 of the 17 communities in the Southeastern Region, illustrate the role of SCS and the districts.

Within the framework of the regional plan, the North Stonington Town Planning Commission is preparing its own comprehensive plan for urban growth and natural resource development, with the help of a private consultant financed by a Federal urban planning assistance grant. SCS provides soils information and other technical assistance through the New London County Soil and Water Conservation District.

Based on five main soil and landscape patterns, the town area was divided into units meaningful in land use and natural resource planning. The delineations are shown on a transparent overlay for use with various planning maps.

A system of stream belts, totaling about 6,500 acres, was delineated on the basis of the watercourses, adjacent wet lands, soils subject to overflow, adjoining areas with severe limitations for urban uses, areas of high open space potential, water-resource development sites, and areas with pollution hazard if developed for urban use. Sixteen water-impoundment sites of regional concern were identified.

About 16 percent of North Stonington consists of very poorly drained soils and marshes. These wet lands present serious limitations for urban development but have many conservation and open space values. As part of the resource planning, the location and acreage of the significant wet lands were shown and an evaluation made of their value and potential for wildlife habitat.

Plans for multiple use of the woodlands that make up three-fourths of the area are considered in North Stonington's plan. Other conservation needs considered include farmland conservation, watershed protection, a system of hiking and riding trails, historic and scenic sites, and public recreation sites. The town conservation commission has embarked on a program to promote conservation among landowners who control most of the area.

Beginning with a nucleus of 10 cooperators in 1965, the conservation district increased the number of its cooperators to 75 by the fall of 1966. Both farm and nonfarm properties are involved, and the conservation plans cover cropland, grassland, woodland, wildlife, and recreational land uses.

In Connecticut, broad plans for the State, the regions, and the towns provide the framework for integrated resource development and use. However, the individual property is still considered the basic unit on which conservation must be done. ♦

A scenic overlook in North Stonington (left) is to be preserved as part of the town's conservation program. Spaulding Pond dam (right) built as part of a watershed project, provides recreation as well as protection from floods.

Residents have their say too . . .

Township Guides Its Future Through Sound Resource Planning

By Neville Mapham and Charles R. Barnett, Jr.
Chairman, Cato Planning Commission, Cato, N. Y.; and Work Unit Conservationist, SCS, Auburn, N. Y.

HOW YOU GO ABOUT getting people's confidence is just as important to a planning commission as how you go about planning.

In planning the future of Cato Township, N. Y., leaders knew that the key to a successful plan is overcoming people's fear that planning and zoning would take away some of their freedom by limiting the use of their property. They took special steps to overcome these fears.

Cato, population 1,800, is gradually becoming an outer suburb of the growing city of Syracuse. Agriculture still dominates community activities, but in the last 10 years the town population has grown 20 percent and is expected to double by 1975.

Town leaders were wondering "how do we want our town to grow?" and "how will it compare with neighboring communities in 20 years?" They wanted to avoid the "growing pains" typical of most urbanizing areas by assuring sound development that would enhance the town's attractive atmosphere while meeting increased resource use.

Clarence Blumer, a director of the Cayuga County Soil and Water Conservation District, broke the news in January 1964 that—as supervisor of Cato Township—he had appointed Neville Mapham to be chairman of the Cato Town Planning Commission.

Mapham, a local physicist, is also a part-time conservation farmer. One of Mapham's first acts was to ask Charles Barnett of the Soil Conservation Service what help was available from SCS and other agencies through the conservation district.

Since Cato was the first township in the Cayuga District to have its soil map completed, the commission quickly made a decision to base all land use planning on this soil survey information. Next, the members determined that they would not hire professional planners at this time.

An engineer, a physicist, a contractor-farmer, a farmer's wife, and a schoolteacher made up the commission that would prepare the actual plan.

These five local people, all novices in town planning, found a simple formula which almost any community can use: Overcome the public's fear of community resource planning through the skillful use of a public information program. The commission's objective was to have a sustained educational program over a period of 2 years which would reach every resident.

Information program

An early news release pointed out spoiled beauty spots and the loss of wildlife, as well as congested highways and tax problems. Commission newsletters, mailed to all town residences, increased interest in town planning. They described good sanitation, profitable employment for young people, and a town "where kids can get a feel for the country." In this way the commission showed its interest in all of the community's problems.

Later news releases reported that the commission had begun its studies of soils, suitable use of land, flooding hazards, commerce, and industry. Ideas from the people of Cato, their likes and dislikes, were emphasized. The commission would be helped, the news releases pointed out, by the County Health Department, Federal and State agencies, town government, and "the people of Cato themselves."

During the winter of 1964-65, the SCS became actively involved in helping Cato with the natural resource phases of community planning. The planning commission bought copies of soil survey field sheets from SCS and put them to many uses. Barnett helped the commission develop three large maps showing soil limitations or suitabilities for homesites, agriculture, roads, and septic tank filter fields.

SCS Soil Scientist Frank Hutton had prepared the soil survey for Cato. His detailed knowledge of all the land under study helped the commission identify groups of soils best suited to agriculture and other uses. He also provided a description of the soils, geology, and land formations in the area.

Soil maps useful

The town superintendent of highways, Donald O'Neill, found that he could use the soil map for locating gravel deposits for needed road work. The location of a proposed road was studied by sketching it on a photo copy of the soil survey map, making it easy to learn about soil-bearing strength, drainage, and other problems.

The map was used to study trends in land use. The survey data had been recorded on aerial photographs made in 1938. Comparing these with more recent photos provided opportunities to study old and more recent land use patterns. The growth in the number of summer residences was easy to spot. It was also clear that many cottages were being developed on soils that are difficult to drain.

The most challenging land use problem was to try to reserve suitable farmland for agriculture. New homes were being built on some of the best agricultural land. Still more good farmland was idle and not for sale at prices farmers could afford because of land speculation. The commission knew that most farms in the area had to expand to remain competitive. Cato farms gross more than $1 million annually, and it was felt that this income had to be safeguarded.

With SCS guidance the commission assembled a complete soil map mosaic of Cato, each mapping unit being colored according to its row-cropping suitability. Woodlands, hardpan soils, and steep or stony areas were heavily discounted.

Similarly, the commission chose extensive areas for residential and recreational development. Here the soil map showed some potential for ponds and marshes, woodland and wildlife cover, as well as soil limitations for homesites and roads.

Members of the commission held many small, informal discussions with the public on important local issues. They considered such points as community water supply, community drainage needs, sewage treatment, beautification, and traffic problems. There was much homework for commission members so they could answer questions.

Finally, the people's wishes had been heard. The town resources had been cataloged. Meetings with all sorts of groups had been held, and even a planning newsletter had been mailed to all residents. The next step was to record the decisions.

The plan is a masterpiece of simplicity. It features a large aerial photographic map of the community. Land use zones on the map are variously colored. Roads are labeled, lakes identified. In the wide margins and on the back of this 24- by 36-inch sheet the planning commission describes its conclusions.

Neville Mapham shows a group of Cato neighbors how a soil map aids in choosing land use.

There are five land use districts: Residential, agricultural, recreational, industrial, and disposal. Regulations for the wise use of each land use district are explained. The steps taken to prepare the plan are outlined. Needed "subdivision" and "land use" ordinances are spelled out in simple terms.

The subdivision ordinance is to be a "tool to make the master plan work." It will protect the public from exploitation by some builders of inferior houses "who collect their money and vanish" leaving town residents to fix roads, sewers, and drainage. Similarly, an ordinance is proposed to prevent substandard homes, small lots, and inadequate parking.

Seen, studied, approved

This written "Plan for Cato" was mailed to every taxpayer, every family in the community. Prominent on the cover page was the suggestion to "study this plan, talk it over . . . and let one of the Cato Planning Board members know how you think the plan can be improved."

The final measure of success came during the public hearings when the plan and proposed regulations were officially presented. When the commission members realized there was little or no misunderstanding or opposition, they knew that their plan of leadership and action had been successful. Shortly afterward the "Plan for Cato" was adopted by the local governing body representing the local people.

Using the plan, a builder can find best sites for new housing; a farmer knows where to buy new land with reasonable tax rates; an outside firm can confidently settle in an area set aside for industry; and the town board can decide more easily where new roads will be needed.

Cato Township now looks confidently to the future. ♦

For one field or several counties . . .

Follow the Basic Steps to Good Resource Planning

By Minott Silliman, Jr.
Resource Planning Division, SCS, Washington, D. C.

IS YOUR COMMUNITY ready to double in size in the next 33 years?

Where will twice as many residences, schools, highways, airports, factories, and other facilities be located? Where will you get—and store—twice the amount of domestic water, energy, and other vital resources? These needs will soar because our Nation's population is expected to double by the year 2000.

There will be as much new construction in the next 33 years as there has been since Columbus reached the New World in 1492. The current demand is for more than 1 million new homes in America each year.

Population is shifting, too—away from the farm, yet back to the country for open space and recreation. These and many other changing needs are creating an awareness that Americans must plan carefully for the orderly use, development, and conservation of human and natural resources. The question is no longer "why plan?" but rather "how do we plan?" and "what do we develop?"

The Soil Conservation Service—with 31 years of experience in helping landowners plan proper land use and treatment—has an active role in community planning and development.

After all, the planning principles and steps are exactly the same whether the objective is to help heal a hillside gully . . . develop a farm or ranch conservation plan . . . solve a group water-management problem . . . plan a watershed project . . . or help design effective use and development of an entire community's land, water, and related resources.

Here are 10 basic steps that SCS and other agencies and groups use every day in effective resource planning and development:

1. Let the people know

There is no substitute for an informed public. It is wasted effort to plan and then attempt to sell the solution to a problem people do not know or believe they have. These are plans that just collect dust on a shelf.

A good information program—set up early and carried throughout the planning process—is essential. Through it, people are made aware of the resource needs or potentials. Then they are more likely to be active in supporting or helping plan for the wise use and care of their resources.

The information program must reflect the impact of the problem on the entire community or region and not just the field or spot involved.

2. A request for help

When people know and become concerned about a problem or opportunity, they decide to do something about it. An individual, or a representative of a group or area, requests help from SCS through the local conservation district.

The cooperator's request may not reflect all conservation needs and opportunities, but it paves the way for developing mutual knowledge and confidence. It gets things started.

"Cooperator" in this article means not only individual land owners and operators, but also community groups, towns, villages, counties, groups of counties, areas or multi-State regions, and others. The cooperating area may be represented by elected officials or by leaders chosen to carry out resource-development work.

A resolution by a town board or planning commission followed by a letter to the district from the clerk or secretary is a common type of community request for help.

3. What the cooperator wants

What are the cooperator's objectives? At first, interests or desires may not be very broad or inclusive. But effective resource planning must begin with people where they are and not where we wish they were. The challenge is to help them increase their knowledge, stretch their imagination, and broaden their sights for all their resources.

We start talking with a landowner about his immediate problem, and soon we are discussing his entire operating unit plus the

watershed, irrigation channel, and other resources he has in common with neighbors. Although the first request from a community may be to help locate suitable soils for a landfill garbage dump, the conversation leads to such items as future needs for water impoundments, good potential recreation areas, or the need to keep new houses or shopping centers out of a flood plain.

Whatever the size of the planning area, the more people in it who participate in setting resource needs, goals, and objectives the better. People who help decide on objectives are more likely to be interested in carrying them out.

4. Make an inventory

To work toward meeting the goals, conceived in step 3, many resource facts are needed. SCS can help obtain certain basic data such as soil surveys or watershed studies. Natural resource data from other agencies or groups also may be needed as a basis for long-range, multiple-use decisions.

How detailed and immediate the inventory must be depends upon the needs and aims of the cooperator—you don't dump the whole load of hay when only one cow comes up to feed.

For a concrete structure on a farm or watershed, careful onsite investigation with deep borings may be needed. But a general soil map may suffice for making broad land use decisions in a county or a multicounty area.

One of the first inventories should be to determine what facts already are available, such as older soil surveys, and then determine what further resource information is needed. SCS can help here. At this point, planners must decide how to obtain any needed surveys or studies—and set up a schedule, manpower, and funds to do them.

Inventories are not a plan. When completed, they become a basis for the total plan.

5. Analyze, interpret, inform

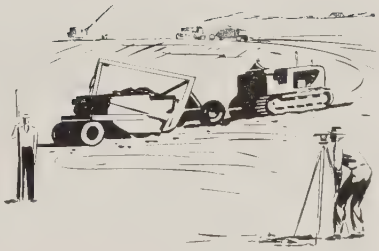
In this step the inventory comes alive. We find out what the resource data mean in terms of both today's and tomorrow's needs and potentials. And analysis and interpretation call for study and thinking. The thinker and computer are no longer regarded as "ivory tower;" they are indispensable in finding out how two of us are going to exist on the same space as one in 33 years.

The inventory findings about soil and water limitations and potentials must then be communicated to the cooperator in terms he can grasp and relate to his objectives. This frequently means colored maps, pictures, and drawings, publications, and even field trips. Soil interpretations, water-impoundment sites, potential recreation areas, or good and bad building sites which are commonplace to technicians will never become real to a citizen until he obtains a visual picture of them.

One planning commission official remarked that a soil survey map looked like a picture of earthworm tracks in the mud until it was colored to show limitations of various soil types for septic tank filter systems.

6. Consider alternatives

How can resources best be developed to meet immediate and long-range goals and potentials of the individual, the group, and the larger community? How can the physical, social, economic, environmental, health, and welfare needs of people best be met?



These questions can be answered only as the cooperator and the technicians work diligently together and constantly reflect back on the objectives.

The technician can present facts, mention ideas, and make suggestions. But the solutions or decisions people like best and usually follow best are the ones they are just certain they thought of or helped develop.

A conservation plan made in the office and then "sold" to the landowner is seldom as effective as one developed around the kitchen table where there is exchange of ideas, feedback, and trial and error. The same basic principle applies when a neighborhood group or a community is considering the future of its area.

Here, as in step 3, we can help people stretch their imagination and broaden their objectives. The alternatives must consider the multiple-use potentials for the resources, and compatibility of uses. Class I farmland seldom reverts back to producing food once it is covered with concrete; and faster runoff brings changes in the watershed.

What about beauty of the landscape and the effect of different alternatives on the physical and mental well-being of people? Pleasure driving in the countryside is the most popular form of recreation.

This step must involve the people affected by the decisions, whether the planning area is 1 acre or a million. In group or community planning, we must help and encourage the decision-makers to explain the alternatives and potentials to their constituents.

7. The cooperator decides

This obvious step becomes less tangible as the size of the area or number of persons involved increases. But firm decisions on resource use can be made by large areas or groups through their elected representatives. In any case, the cooperator must make the decision.

The firmness of a planning decision—on one field or three States—depends to a large extent on how thoroughly and effectively steps 1 through 6 have been carried out.

An affirmative vote at a town, community, or watershed association meeting may be the only form of decision possible to adopt a certain course of action for handling the resources. A resolution by the city, village, or county governing body can establish a decision to proceed on certain types or phases of land use or treatment. Allocation of money by an individual or group for a specific conservation project is a firm decision.

8. Record the decision

Decisions are easier to carry out if they are set down on paper. In what form the planning decisions are recorded varies with the situation. It may be a farm conservation plan. It may be the written working arrangement between an individual, group, town, county area, or region and the local conservation district and cooperating agencies.

In any case, the record expresses the intent of the plan and sets forth any new policies or priorities.

9. Putting the plan to work

This step is the most popular part of the planning process; it is the reason for the planning process. As Israel Stollman said in an article in the 1963 *Yearbook of Agriculture*, "It is more popular than making the plans themselves: Therefore, we are often implementing plans that do not exist."

Often, especially on smaller jobs, progress is easy to spot. New trees, greener grasslands, lined irrigation ditches, or land use changes are visual proof that a farm or ranch conservation plan is being applied.

Implementation of a plan by a larger group takes longer and more diverse actions which are also harder to pinpoint or detect. This fact causes some to feel that the plan is just gathering dust—which, of course, can happen if it is not the people's plan.

Just as a conservation plan for a farm or ranch is usually implemented by several individual projects, natural resource plans for larger areas are implemented through individual actions—a developer changes the location of his proposed subdivision to take advantage of more suitable soils or a proposed water impoundment . . . a county zoning board bases its zoning map on the soil survey . . . or five conservation districts in a multicounty planning area develop a joint program for the whole area.

Thus, broad community plans are put to work slowly but surely—if properly developed—by levels or units of authority below them.

10. Evaluate and update

Experience is a great teacher in land use and treatment. As needs and demands change, as new methods and technology crop up, individuals and groups need to take a fresh look at their objectives and update their plans.

This means going back through each planning step to achieve best results and best use of resources.

In community resources and development, these principles should be kept constantly in mind:

- Planning is a continuing process. It is a decision-making process and not a forecasting service. Neither is it zoning—it should precede zoning.
- Planning must be *with* people and not *for them*. Public discussions must be included from the very beginning.
- The same planning steps are needed whether dealing with a field, farm, neighborhood, town, county, State, or region.
- People can and will think broadly and are anxious to work together for the wise use of soil, water, and related resources. Local people and their leaders are the key to success.
- Planning must involve the physical, social, economic, political, and environmental welfare of all segments of the community—both rural and urban—if it is to be accepted and carried out.
- Seldom does one agency or group have all the answers or help needed. Teamwork, both public and private, is vital.
- Planning is not an easy academic exercise. It involves time, money, and hard work—and reverses can be expected. But the rewards from continued development of human and physical resources are well worth the trouble.

Surely a nation that plans to put a man on the moon can make and carry out plans to improve its resources for the welfare of all its citizens—especially that extra person who will be standing beside each of us in the next few years. ♦

Recreation developments, such as this pond, give a new and pleasant look to formerly unprofitable farmland in the Copper Country.

Copper Country Framework Program Is Basis for Long-Range Planning

By Martin E. Kangas
Work Unit Conservationist, SCS, Ontonagon, Mich.

A NEW "framework program" for the counties of Ontonagon, Houghton, and Baraga brings a new kind of optimism to the residents of Michigan's Copper Country, an area that has been subjected to the planning process for years.

The program is set forth in a 50-page booklet of facts, figures, and ideas for raising the economic level of this scenic Northland.

A two-way key

The sponsors hope that the framework program will be a key that turns both ways—a way out of the economic problems and disadvantages for Copper Country residents—and a way into wholesome recreation and enjoyment of natural beauty for thousands of urban-based Americans.

The Copper Country, which gets its name from the once-flourishing mining industry, is known to planners as a "broad program area." This means it is a large land area with similar topography, natural resources, and culture that makes a convenient unit for planning. Such areas are now scattered throughout the Northern Great Lakes Region.

Copper Country folks have already aroused notable optimism through the imagination and cooperation that went into their resource study. Now they're ready to work on the details of making realities of their broad framework program of resource conservation and development.

Change is in the offing, and leaders know they must be ready to adjust to new land uses.

Opportunities turned up by detailed analysis of the area have bolstered the confidence of both public and private developers.

What was the spark that lit the fires of action in the Copper Country? It's a long story, as any of the citizens of that once remote area can tell you. It involves something of the history of the region—the tragic disruption of community life by the continuing closedown of copper mines and deep iron ore mines, the depressed agricultural economy, the low net income from woods work.

Land and people

The spark was fanned into flame at a collective hearing known as the Land and People Conference, held at Duluth, Minn., in September 1963. There, 1,200 community leaders from 81 counties of the Northern Great Lakes area of Minnesota, Wisconsin, and Michigan aired their mutual problems. And collectively they decided to do something about them.

Governors from the three States pledged their support to economic expansion through resource development. Back home again, Copper Country leaders plunged into the planning process with energy and enthusiasm.

The Soil Conservation Service assigned a three-man staff to aid the local soil conservationists in their work with conservation district directors.

Assistance was also provided by the Michigan State University Cooperative Extension Service, the U. S. Forest Service, Michigan Department of Conservation, plus many other agencies, groups, and individuals. Land owners and operators were called in to express their opinions and attitudes toward a more intensive development of the area's resources.

The directors adopted a three-step approach in formulating a framework program of develop-

ment for the Michigan Copper Country Broad Program Area, as it was officially named.

First, an inventory was made of the area's natural resources. This included a study of land use by agriculture, forestry, and recreation. Landownership patterns were classified by public ownership, large private (more than 5,000 acres), and small private ownership.

Second, an evaluation of resource-development possibilities was made. Land-resource-area maps and information provided by SCS were used extensively.

For example, the heavy clay soils in the southern section of the Broad Program Area indicate grassland use and are well suited to a range-type beef enterprise. The sandy loam soils along the shore of Lake Superior are good for potatoes, truck crops, and strawberries. Extensive forested areas offer possibilities for the increased development of primitive-type recreation, such as hunting, fishing, camping, and hiking. They also provide an opportunity for improved woodland management. More than 3,000 lakes with 38,000 acres of surface water provide many sites for water-based sports and recreation.

The economic potential

The third step was an estimate of the economic potential of resource development. Population distribution, highway location, traffic patterns, transportation facilities, and present developments were all considered.

For this initial evaluation, the district directors selected 30 enterprises from a longer list of possibilities in the private sector of land uses—8 in agriculture, 13 in recreation, and 9 in forestry.

Certain enterprises were recommended for immediate action. The directors are incorporating these development plans into their individual district conservation programs.

Thus, dairy, beef, potato, and strawberry production will be emphasized first in the agriculture field. Campgrounds, ski areas, and vacation farms will be given priority in recreation development. Woodland management, marketing, and harvesting efficiency were placed on the priority list in forestry.

Broad area planning has shown that many enterprises have comparative advantages in the Copper Country that were not readily apparent at the outset.

The momentum created by the planning process has produced a renewed and revitalized enthusiasm for resource development among conservation directors and cooperators alike.

A logical outgrowth of this new planning process has been an objective, up-to-date look at the long-range goals and programs of the area and of the individual districts.

This is only the beginning. Additional development is sure to come.

Planning is a continuing process and broad area planning will continue. But added income-producing enterprises are assured today because of the work initiated by district directors in northern Michigan's Copper Country. ♦

Chairmen of boards of directors of three soil conservation districts discuss with SCS conservationists possible economic uses of idle farmland such as that shown below. In the picture above, from left to right are: Fred Kekko, work unit conservationist, Houghton SCD; Kenneth McManus, assistant State conservationist, East Lansing, Mich.; Martin Kangas, work unit conservationist, Ontonagan; Robert Williams, SCS work unit conservationist, Baraga SCD; Palmer Skalland, State soil conservationist from Michigan; Joseph Sternad, chairman of Ontonagon SCD; Toivo Lahti, chairman, Houghton SCD; and Robert Goudell, chairman, Baraga SCD.

Beauty a Product of Conservation

McKinley Oldham (right) and Ed Sanders, SCS work unit conservationist, study the accomplishments on Oldham's farm and plan for the future.

IN keeping with the national objective to improve the natural beauty of the countryside, McKinley Oldham takes pride in the maintenance of conservation practices and in the appearance of his property on his 66-acre farm in Clark County, Ky.

Thousands of people annually view his roadside beautification as they travel Interstate 64 about 8 miles east of Winchester.

When Oldham moved to the farm after retiring from the Post Office Department in Chicago, he soon found he needed assistance on many problems with his farming program.

Through the Clark County Soil Conservation District, SCS helped Oldham develop a conservation plan in 1958. Using a land capability map, he selected 3 acres of the best ridge land for a tobacco rotation, retired 4 acres of steep land from corn production, and planned all other land for pasture, hay, and woodland.

In 7 years, he has established 50 acres in Kentucky 31 fescue, red clover, and Korean lespedeza for his beef cattle; eliminated unsightly shrubs; and keeps steep hillsides in grass and his pastures mowed.

During the summer of 1965, he brought his conservation plan up to date and built a multipurpose farm pond for stock water, irrigation, and recreation.

A dedicated conservationist, Mr. Oldham believes the land he owns has been given to him to administer as a sacred trust and that he has a moral responsibility to improve it for future generations.—EDWARD L. SANDERS, *Work Unit Conservationist, SCS, Winchester, Ky.* ♦

Water Reserve Low in Western States

With soils generally drier than usual and slightly less than average carryover of stored water in reservoirs, Western States need better than average snowfall this winter to assure an average water supply for the 1967 irrigation season.

The 1966 fall water-supply summary issued by the Soil Conservation Service reported that irrigation needs in most of the West were reasonably well supplied in 1965. Streamflow was deficient, however, in Oregon, Wyoming, Nevada, Utah, and Colorado.

Any serious deficiency in winter snowfall will result in water shortages in 1967 in parts of Colorado, Utah, Wyoming, Idaho, and eastern Oregon. ♦

SCDs Give NYC Boys on-the-job Training

By participating in the work-study program authorized by the Economic Opportunity Act, West Virginia soil conservation districts are providing on-the-job experience to 14 college students.

The districts have entered into agreements with West Virginia University to furnish jobs for students in need of employment to continue their education. Under this program, the districts select work locations and provide a part of each student's salary.

The selected students major in agriculture, civil engineering, forestry, agricultural engineering, and biology and, under the supervision of SCS technicians, perform work similar to that of soil conservation aids and engineering aids.

In addition to job training, the students are given the opportunity to learn about careers in soil and water conservation and the qualifications needed for such positions. ♦

Realtor Honored for Use of Soil Surveys

A real estate man who pioneered the use of soils information in urban land development was named 1966 "Realtor of the Year" by the Northern Virginia Board of Realtors.

Verlin W. Smith of McLean, Va., led a crusade several years ago for a soil survey of Fairfax County and pioneered land use planning based on soils information.

He contributed an article, "A Realtor's Views About Soil Surveys," to the December 1960 issue of *Soil Conservation*, in which he stated, "I am convinced that up-to-date soil surveys furnish information that is fully as important to rurban and suburban developments as it is to farmers."

Smith now is instructor of a course in land usage in the real estate board's program of continuing education.

Earlier last year, Smith was also selected as "Man of the Year" by the Fairfax County Chamber of Commerce. ♦

Soil Conservation in the Changing Landscape

Summary of Activities of the Soil Conservation Service 1966

SOCIAL and economic goals claimed the attention of the Soil Conservation Service in 1966 to a greater extent than ever before.

The Service provided basic resource data and planning assistance for a wide range of community and regional activities aimed at stimulating economic development, increasing job opportunities for disadvantaged people, guiding land use changes in the path of urban development, improving the quality of the rural and suburban environment, increasing outdoor recreation facilities, and similar efforts to provide a better life for people in the changing rural landscape.

The broadening services were in addition to continuing assistance to individual land owners and neighborhood groups in the solution of soil and water conservation problems on their own properties.

SCS's traditional technical assistance to local conservation districts, to sponsors of small watershed projects, to participants in the Department's Agricultural Conservation Program and Great Plains Conservation Program, and other organized conservation efforts continued on about the same level as the year before.

Involvement of SCS in the Nation's human welfare efforts indicates no change in the function of the agency. It derives from the fact that economic growth depends on the sound development and correct use of natural resources, and that healthful and pleasant surroundings for people to live, work, and play in result from the way those same resources are protected and cared for.

The availability in the Soil Conservation Service of basic information about soil and water resources and the technology of using, conserving, and managing them, and the plant and animal life dependent on them, leads naturally to the participation of SCS in community development and improvement programs throughout the country.

Broad area planning

The Soil Conservation Service assisted, in one way or another, with broad area resource-planning activities in every State in 1966.

These varied in scope from neighborhood groups of landowners with water problems that crossed property lines to agencies concerned with major river basins or regions including parts of several States. They included municipal and county land use planning bodies responsible for guiding urban expansion, Technical Action Panels and Rural Area Development committees of counties and States, Resource Development and Conservation projects, and other formal and informal planning groups.

Assistance in most instances included providing basic soils information for the area involved. Ordinarily, this included a detailed soil survey or a special reconnaissance survey, often made in cooperation with, and partially financed by, the interested local government.

In addition to supplying maps and descriptive information, SCS soil scientists and conservationists helped interpret the basic data in terms of the suitability of the soils for different uses, as for agriculture, building construction, highways, residential sewage disposal fields, recreation, wildlife habitat, and other alternatives that need to be considered in general land use plans for an area. They also provided information about erosion and runoff problems likely to be encountered and methods for dealing with them in both rural and urban areas.

In fiscal 1966, SCS provided basic data for use in comprehensive planning on more than 21 million acres, a six-fold increase over 1965. Nearly ⅛ million consultive services to such groups and to individual land developers amounted to a 19 percent increase in this kind of activity over the previous year.

Meantime, through soil conservation districts and other local arrangements, SCS helped prepare plans for 3,214 group projects for the establishment of conservation measures, an increase of 8 percent over the previous year. The plans involved 62 percent more (26,363) land owners and 55 percent more land area (2,177,077 acres) than in 1965.

That 1966 continued a trend of increasing service to groups is shown by the following summary for the past 5 years:

	Group plans prepared		
Year	*Plans*	*Landowners*	*Acres*
1962	2,460	19,013	1,319,918
1963	2,473	15,075	1,141,579
1964	2,832	17,234	2,278,602
1965	2,965	16,309	1,403,000
1966	3,214	26,363	2,177,077

The rural-urban transition

The Soil Conservation Service was increasingly engaged with soil and water problems arising out of the profound changes in land use

occurring on the edges of expanding urban areas.

Many soil conservation districts, originally organized in strictly rural territory, today find their farmer cooperators being replaced by land developers, industries, and urban residents with entirely different intentions regarding the use of the land.

District governing bodies, and the conservation agencies assisting them, are faced with a wide spectrum of completely new problems in these rural-urban transition zones.

In these areas, the Soil Conservation Service is providing specialized information and technical services in soil and water conservation on land going into nonagricultural uses. Such work accounts for a large part of the increase in consultive services mentioned previously.

The Congress recently recognized the Department of Agriculture's responsibility to provide guidance in land use changes and assistance with soil and water problems in areas of urban development by enacting Public Law 89–560 providing explicit authority to make soil surveys in such areas as well as on agricultural land.

Under this act, SCS will continue to provide leadership for the National Cooperative Soil Survey, including rural-urban transition zones in survey areas under appropriate cooperative arrangements with local agents.

RC&D projects

The Soil Conservation Service provided planning assistance to 10 new Resource Conservation and Development projects authorized for Federal assistance in fiscal 1966.

Before the end of the year, the sponsors of 3 of the projects had completed their plans, and the projects were authorized by the Secretary of Agriculture for assistance in operations. The first 10 pilot projects had been planned and authorized for USDA assistance in fiscal 1965.

The multicounty RC&D projects are designed to help local people overcome economic decline in rural areas by developing the local economy through resource use and conservation.

Project sponsors assemble an inventory of the natural resources and plan measures for their utilization in the local economy, with USDA and other assistance under the leadership of a project coordinator assigned by SCS.

The sponsors—including soil and water conservation districts, county governing boards, municipal governments, conservancy districts, and similar bodies—coordinate available assistance from Federal, State, and private sources to carry out project plans.

Already, the older projects are moving into construction phases of the work. By the end of fiscal 1966, sponsors had activated more than 600 project measures.

These have the effect of broadening the programs of soil and water conservation districts, accelerating small watershed projects, creating better rural facilities, helping eliminate the cause of poverty, and making rural America a better place to live.

Appalachian development

The SCS provided added technical assistance, over and above regular programs, for soil and water resource development under the Appalachian Regional Development Act to 12,982 people in fiscal 1966. Of these, 3,160 became new soil conservation district cooperators.

SCS helped 3,553 individual cooperators prepare complete soil and water conservation plans and 5,330 landowners develop 67 group conservation plans under the Appalachian Program.

During the year, 13 new watersheds were authorized for planning and 15 others approved for installation of land treatment and structural measures in the Appalachian region. This brings the total of operating watershed projects in Appalachia to 83, in addition to 22 that have been completed, representing a total Federal cost of about $106 million.

These projects contribute to economic development through positive additions to water resources and economic activity, as well as through avoidance of damages from floods and sedimentation.

Great Plains conservation

In the Great Plains Conservation Program, 3,783 new contracts were signed covering complete conservation plans for 6,069,430 acres. Work was completed and contracts terminated on 1,831 farms totaling 2,669,885 acres.

In its ninth year of operation, the program has 23,772 contracts covering 45,210,250 acres. In this area of uncertain rainfall and easily erodible soils, the plans provide for conversion of 22 percent of the cropland to more suitable uses, mainly permanent grass.

Participants established new permanent vegetative cover on 189,003 acres and seeded 135,612 acres of depleted range with Government cost-sharing under the program. They also controlled competitive shrubs on 435,216 acres of rangeland and built 6,192 miles of terraces on cropland.

The total of cost-shares paid for establishing conservation measures in fiscal 1966 was slightly more than $10 million.

Watershed protection

Thirty-seven watershed protection and flood prevention projects were completed in fiscal 1966. Ninety-four additional projects were approved for operations, and 100 others were approved for Federal assistance in planning.

By the end of fiscal 1966, 12 years after enactment of Public Law 566, the small watershed program had grown to include 729 projects totaling 41.5 million acres

Summary of Progress, Fiscal Year 1966

Total reportable progress in soil and water conservation programs assisted by the Soil Conservation Service

Progress items	Fiscal year 1966	Cumulative to June 30, 1966
Individual Conservation Plans and Related Services		
District cooperators .....No.	115,419	2,080,231
District cooperators .....acres	40,599,514	685,513,144
Cooperators canceled .....No.	65,224	—
Cooperators canceled ....acres	21,023,430	—
Landowners assisted .....No.	1,167,186	—
Services provided .....No.	3,386,471	—
Owners applying practices .No.	744,274	—
Basic plans prepared:		
Farm .....No.	91,248	1,529,375
Ranch .....No.	3,699	60,826
Other .....No.	4,820	26,886
(Total basic plans)	(99,767)	(1,617,087)
Farm .....acres	18,913,360	318,765,171
Ranch .....acres	14,698,628	192,811,199
Other .....acres	414,687	4,388,381
(Total basic plans, acres)	(34,026,675)	(515,964,751)
Basic plans canceled:		
Farm .....No.	44,508	—
Ranch .....No.	1,602	—
Other .....No.	467	—
(Total plans canceled)	(46,577)	—
Farm .....acres	8,882,328	—
Ranch .....acres	5,682,430	—
Other .....acres	31,141	—
(Total plans canceled, acres)	(14,595,899)	—
Basic plans revised:		
Farm .....No.	36,120	—
Ranch .....No.	2,757	—
Other .....No.	187	—
(Total plans revised)	(39,064)	—
Farm .....acres	10,994,610	—
Ranch .....acres	11,949,574	—
Other .....acres	30,561	—
(Total plans revised, acres)	(22,974,745)	—
Consultive Services		
Services provided .....No.	112,337	—
Recipients .....No.	59,527	—
Basic data for use in comprehensive plans .....No.	921	—
Basic data for use in comprehensive plans .....acres	21,041,551	—
Properties adequately treated .....No.	1,754	—
Properties adequately treated .....acres	70,654	—
Operating Units		
Total operating units .....No.	8,811	4,732,787
Total operating units ...acres	1,644,471	1,351,102,271
Other units .....No.	5,574	1,200,390
Group Conservation Plans and Services		
Group investigations .....No.	4,157	37,677
Group investigations ....acres	3,460,685	31,505,209
Group plans prepared ....No.	3,214	36,795
Group plans prepared ...acres	2,177,077	26,456,331
Landowners or users in groups .....No.	26,363	267,343
Services provided on jobs..No.	55,932	—
Great Plains Conservation Program		
Applications received .....No.	4,307	28,256
Applications received .....acres	6,682,649	55,890,705
Contracts signed .....No.	3,783	23,772
Contracts signed .....acres	6,069,430	45,210,250
Contract modifications ....No.	16,197	81,814
Great Plains Conservation Program—Continued		
Contracts terminated:		
By mutual consent .....No.	117	498
By mutual consent ....acres	219,453	942,708
For cause .....No.	89	482
For cause .....acres	63,942	416,906
By expiration .....No.	1,625	5,746
By expiration .....acres	2,386,490	8,897,655
(Total terminations, No.)	(1,831)	(6,726)
(Total terminations, acres)	(2,669,885)	(10,257,269)
Cropland before GP contract, acres	978,070	6,851,345
Planned cropland conversion, acres	185,123	1,476,553
Agricultural Conservation Program		
Referrals received F.Y. 1966 No.	354,851	—
Referrals received P.Y. 1965 No.	—	383,423
Referrals serviced F.Y. 1966 No.	346,681	—
Referrals serviced P.Y. 1965 No.	—	368,278
Applachian Land Stabilization and Conservation Program		
Conservation and development plans approved ....No.	5,853	—
Technical referrals serviced No.	401	—
Cropland Conversion Program		
CCP referrals received ...No.	210	—
CCP referrals serviced ....No.	526	—
CAP referrals serviced ....No.	30	—
Soil Surveys		
Standard soil surveys:		
High intensity .....acres	1,957,016	27,775,207
Medium intensity ....acres	40,983,846	518,125,201
Low intensity .....acres	10,438,482	82,702,591
(Total mapping)	(53,379,344)	(628,602,999)
Reconnaissance .....acres	3,777,752	14,166,607
Soil conservation surveys..acres	1,825,847	274,653,417
Soil conservation surveys canceled or converted ..acres	14,389,835	—
Supplemental soil surveys acres	7,806,306	—
Snow Surveys and Water-Supply Forecasting		
Snow course measurements.No.	4,745	—
Aerial snow marker readings .....No.	854	—
Mountain precipitation gage readings .....No.	1,119	—
Soil moisture readings ....No.	1,325	
River stations for which numerical forecasts issued...No.	488	—
Numerical forecasts issued No.	2,396	—
Income-Producing Recreation Enterprises		
Landowners with one or more income-producing recreation enterprises .....No.	4,266	34,740
Landowners with recreation enterprises as primary income source .....No.	524	3,290
Landowners with recreation enterprises as primary income source .....acres	147,412	1,231,288
Public Recreation Developments		
Recreation or fish and wildlife developments established as part of watershed projects.No.	8	20

Summary of Progress, Fiscal Year 1966 (continued)

Total reportable progress in soil and water conservation programs assisted by the Soil Conservation Service

Practices	Fiscal year 1966	On the land June 30, 1966
Conservation Practices Applied		
Bedding ....acres	23,369	452,233
Brush control ....acres	3,668,457	31,876,068
Irrigation canal or lateral miles	478	37,577
Cattle walkway ....miles	11	257
Chiseling and subsoiling..acres	624,316	3,564,712
Clearing and snagging ..miles	270	2,243
Conservation cropping system ....acres	21,876,363	155,139,459
Contour farming ....acres	4,111,646	42,795,278
Contour furrowing ....acres	57,474	703,256
Contouring orchard, etc. .acres	8,425	187,814
Controlled burning ....acres	382,318	3,186,540
Cover and green manure crop ....acres	3,927,526	27,414,907
Critical area planting ....acres	105,169	1,505,260
Crop residue use ....acres	17,114,742	112,731,349
Cutback border ....miles	111	1,538
Dam, diversion ....No.	799	20,865
Dam, multiple purpose ....No.	379	4,050
Debris basin ....No.	2,037	82,041
Range deferred grazing..acres	14,190,351	48,916,804
Desilting area ....acres	485	3,506
Dike and levee ....miles	250	9,067
Irrigation ditch and canal lining ....miles	1,424	20,478
Ditchbank seeding ....miles	1,061	18,778
Diversion ....miles	3,358	89,922
Dune stabilization ....acres	1,100	83,474
Emergency tillage ....acres	245,441	3,181,231
Farm pond ....No.	51,935	1,475,708
Farmstead and feedlot windbreak ....acres	31,029	634,803
Field border planting ...miles	1,272	39,700
Irrigation field ditch ....miles	3,149	121,611
Field windbreak ....miles	3,717	79,743
Firebreak ....miles	9,405	122,338
Fish and crop rotation ..acres	4,080	14,618
Fishpond stocking ....No.	45,069	783,299
Fishpond management ....No.	24,583	146,593
Floodwater diversion ....feet	42,519	957,502
Floodwater-retarding structure ....No.	732	8,283
Floodway ....miles	29	403
Grade stabilization structure ....No.	11,493	196,850
Grasses and legumes in rotation ....acres	1,582,237	19,992,033
Grassed waterway or outlet.acres	85,568	1,599,001
Hedgerow planting ....miles	324	29,898
Hillside ditch ....miles	369	7,217
Irrigation pipeline ....miles	3,962	48,637
Irrigation storage reservoir..No.	1,160	38,729
Irrigation system, sprinkler..No.	3,907	93,888
Irrigation system, surface and subsurface ....No.	4,521	111,793
Irrigation system, tailwater recovery ....No.	596	7,334
Irrigation water management ....acres	2,805,073	12,217,649
Land clearing ....acres	645,758	11,607,918
Drainage land grading ..acres	31,674	190,413
Irrigation land leveling ..acres	447,379	8,571,149
Land smoothing ....acres	330,405	4,854,932
Livestock exclusion ....acres	810,756	19,187,039
Minimum tillage ....acres	1,292,608	8,054,973
Drainage main or lateral .miles	7,640	278,614
Mole drain ....miles	29,166	45,278
Mulching ....acres	30,969	440,676
Mulch planting ....acres	41,427	162,920

Practices	Fiscal year 1966	On the land June 30, 1966
Conservation Practices Applied—Continued		
Woodland natural seeding..acres	78,780	2,816,969
Obstruction removal ....acres	32,905	744,092
Pasture and hayland management ....acres	8,994,833	30,041,064
Pasture and hayland renovation ....acres	1,512,417	18,328,281
Pasture and hayland planting ....acres	2,209,924	45,434,000
Pipeline for livestock water ....miles	1,634	15,748
Pitting ....acres	14,162	153,788
Plow planting ....acres	115,439	1,426,416
Pond sealing or lining ....No.	773	9,110
Range proper use ....acres	67,008,778	179,706,513
Woodland proper grazing acres	1,338,980	9,279,193
Pumped well drain ....No.	8	120
Pumping plant for water control ....No.	1,939	42,837
Range renovation ....acres	13,485	1,406,119
Range seeding on converted land ....acres	164,149	4,560,543
Range seeding ....acres	361,161	7,699,489
(Total range seeding, acres)	(525,310)	(12,260,032)
Irrigation pit or regulating reservoir ....No.	1,818	40,332
Regulating water in drainage systems ....acres	16,389	534,710
Rock barrier ....miles	4	53
Range rotation—deferred grazing ....acres	2,302,296	10,165,570
Row arrangement ....acres	440,426	2,566,533
Recreation access road ..miles	566	4,852
Recreation area stabilization ....acres	1,342	24,272
Recreation area planting .acres	19,381	113,973
Recreation area pruning and thinning ....acres	6,162	36,385
Recreation land grading and shaping ....acres	17,338	78,942
Recreation trail and walkway ....miles	217	2,103
Spoilbank spreading ....miles	4,681	121,718
Spring development ....No.	4,119	88,555
Stock trail ....miles	123	2,988
Streambank protection ..miles	469	5,041
Stream channel improvement ....miles	1,556	11,140
Stream channel stabilization ....miles	20	586
Stripcropping, contour....acres	200,415	5,395,221
Stripcropping, field ....acres	88,731	1,635,166
Stripcropping, wind ....acres	352,073	13,401,369
(Total stripcropping, acres)	(641,219)	(20,431,756)
Structure for water control No.	75,610	1,383,665
Stubble mulching ....acres	3,385,423	17,835,788
Drainage field ditch ....miles	5,080	152,408
Terrace, basin ....miles	133	2,466
Terrace, gradient ....miles	19,610	826,928
Terrace, level ....miles	12,581	364,194
Terrace, parallel ....miles	6,080	40,341
(Total terraces, miles)	(38,404)	(1,233,929)
Tile drain ....miles	25,553	650,785
Tile system structure ....No.	8,691	157,275
Toxic salt reduction ....acres	82,161	1,205,938
Tree planting ....acres	279,357	12,294,883
Trough or tank ....No.	10,645	311,917
Vegetative barrier ....miles	421	6,414
Vertical drain ....No.	40	1,607
Waterspreading ....acres	26,287	838,287

Summary of Progress, Fiscal Year 1966 (continued)

Total reportable progress in soil and water conservation programs assisted by the Soil Conservation Service

Practices	Fiscal year 1966	On the land June 30, 1966
Conservation Practices Applied—Continued		
Well ..... No.	7,441	370,060
Wildlife habitat preservation ..... acres	1,599,898	9,316,239
Wildlife wetland development ..... acres	59,984	806,708
Wildlife habitat development ..... acres	238,135	2,914,691
Wildlife wetland preservation ..... acres	231,375	2,167,172
Wildlife watering facility . No.	484	5,072
Woodland direct seeding . acres	11,797	477,338
Woodland harvest cutting acres	802,859	14,489,992
Woodland intermediate cutting ..... acres	837,330	14,019,749
Woodland interplanting . acres	28,378	814,239
Woodland pruning ..... acres	22,133	550,899
Woodland thinning ..... acres	55,856	1,523,630
Woodland underplanting . acres	24,600	829,899
Woodland weeding ..... acres	351,260	9,012,610
Land Treated		
Land adequately treated . acres	25,274,334	265,243,043
Land Use Conversions[1]		
Cropland to grassland ... acres	1,396,383	12,829,115
Cropland to woodland ... acres	80,537	1,450,871
Cropland to wildlife recreation ..... acres	61,993	589,057
Cropland to "other" ... acres	55,000	2,507,508
All other uses to cropland . acres	230,140	3,573,639
All other uses (except cropland) to wildlife-recreation .. acres	248,738	2,237,515

[1] Conversions on the land June 30, 1966, are estimates of conversions since July 1, 1962.

approved for operations and another 482 projects totaling 42.6 million acres approved for planning. A total of 2,502 applications covering 181.6 million acres have been submitted to the Soil Conservation Service for consideration.

The community development benefits of the projects are becoming more evident with each passing year. New municipal, domestic, and agricultural water supplies, new industries, and new recreation facilities have brought new jobs, income, security, and pleasure to the people of rural communities that have combined broad-scale resource planning with the primary objective of flood prevention in watershed projects.

As these results have become more widely known, there has been a marked trend toward multipurpose projects in new proposals throughout the country. As of June 30, 1966, more than half the projects approved for operations included multiple purposes, compared to only 21 percent in 1957.

Of 92 watershed work plans completed during fiscal 1966, 70 of them, or 76 percent, included purposes in addition to flood prevention. Public recreation development was a part of 28 of the work plans. Municipal and industrial water-supply storage was provided for in 13 projects.

Specific flood-prevention measures installed in 1966 included 732 floodwater-retarding structures, 11,493 grade-stabilization structures, 29 miles of floodways, 250 miles of dikes and levees, and 1,556 miles of stream-channel improvement.

River basin surveys

At the end of the fiscal year, SCS was participating in 43 separate surveys of water and related land resources of the Nation's major river basins in cooperation with other agencies. The investigations cover about 75 percent of the total land area of the 48 mainland States.

Eight comprehensive framework (type I) studies and 15 comprehensive detailed (type II) studies were being conducted under the auspices of the newly formed Water Resources Council.

Of 20 cooperative comprehensive studies (type IV), 17 were in cooperation with State and local agencies, and 3 with the Corps of Engineers.

Soil conservation districts

Soil conservation districts responded to the changing character of land use and conservation problems by modifying their programs to include conservation not only of soil and water but of other resources and to give more attention to areas of urban expansion.

By year's end, 2,387 or 82 percent of the 2,995 districts being assisted by SCS had entered into new working agreements with the Department of Agriculture to cover such broadened long-range programs. These include 19 new districts formed during the year.

Changes in district organization and boundaries during the year resulted in a net increase of six districts and 15,711,351 acres over the area included a year ago. Conservation districts in the United States, Puerto Rico, and the Virgin Islands now contain 1,768,992,000 acres and include nearly 99 percent of the farms and 95 percent of the land in farms.

More than 2 million landowners controlling 685,513,144 acres are cooperating with the districts, and 1,617,087 of them have basic conservation plans on 515,964,751 acres. The Soil Conservation Service assisted 99,767 cooperators prepare basic plans for 34,026,675 acres in fiscal 1966. Districts added 115,419 new cooperators controlling 40,599,514 acres during the year.

During the year SCS assisted 1,167,186 cooperators in planning or applying conservation work;

744,274 of them applied at least 1 conservation practice.

The table shows the amounts of each of 124 separate practices applied during the year with direct technical assistance from SCS or from programs in which SCS participates.

The planned treatment was completed on 25,274,334 acres during the year, equivalent to 74 percent of the acreage for which basic plans were prepared.

This brought the acreage adequately treated to 265,243,043 acres, equivalent to about 51 percent of the total covered by basic conservation plans.

Soil surveys

During fiscal year 1966 detailed soil surveys were completed on 55,205,191 acres, bringing the cumulative total for detailed soil surveys (published and unpublished) to 903,256,416 acres.

In addition, reconnaissance soil surveys were completed on 3,777,752 acres, bringing the cumulative total to 14,166,607 acres.

A review of uses being made of soil surveys and the benefits resulting from their use showed that they generally bring at least $2 of return the first year for each dollar spent in the entire cost of making and publishing the survey. The average published soil survey is useful for at least 25 years.

In areas of high intensity land use, such as rapidly growing metropolitan areas, cost savings resulting from using published soil surveys over the 25 years averaged $123 for each dollar of survey cost. In mixed farming areas of medium intensity land use the average benefit-cost ratio was about $61 to $1; and in range and woodland areas of low intensity land use, $46 to $1.

Land conversions

Adjustments in land use to better match land capabilities as a part of good conservation practice shifted approximately 1½ million acres out of cultivation into other uses in 1966.

The pace of such conversions slowed down somewhat from recent years, however, as farmers became more aware of needs for food supplies in other parts of the world. Cropland conversions in 1966 were 27 percent less than in 1965.

Most of the converted cropland, 1,396,383 acres, was established in permanent grassland. Of the remainder, 80,537 acres went into woodland, 61,993 acres into wildlife and recreation, and 55,000 acres to other uses.

Outdoor recreation

Rural landowners continued to establish new outdoor recreation facilities at an accelerated pace in 1966.

They converted 310,531 acres of land to recreation and wildlife use, a 9 percent increase over the previous year. A total of 4,266 landowners established new income-producing recreation enterprises, and 524 converted to recreation as a primary source of income on a total of 147,412 acres.

Conservation practices established on recreation land included 1,342 acres of recreation-area stabilization, and 19,381 acres of recreation-area planting.

Eight public recreation developments were established as part of watershed projects under Public Law 566.

Job training

The Soil Conservation Service cooperated with State conservation agencies and local soil conservation districts in a variety of projects to provide job training for disadvantaged young people under the Economic Opportunity Act.

In 33 States, SCS participated in Neighborhood Youth Corps projects by providing technical guidance and supervising the work of enrollees assigned to field office jobs in soil conservation districts.

Total of 1,456 young people got practical experience in conservation-related jobs under SCS supervision in 486 different conservation districts.

In addition, SCS participated in work-study programs involving 125 college students at 89 locations in 15 States.

International assistance

As a means of developing agriculture to increase food production, the Soil Conservation Service provided technical assistance and training to a number of nations under a variety of arrangements worked out through Agency for International Development, Food and Agriculture Organization, the State Department, and United Nations.

In fiscal 1966, SCS had 27 conservation technicians on long-term assignment to projects in Tunisia, Thailand, Nigeria, Nicaragua, Brazil, and Algeria. Some 30 SCS technicians were in 17 foreign countries on short-term assignments.

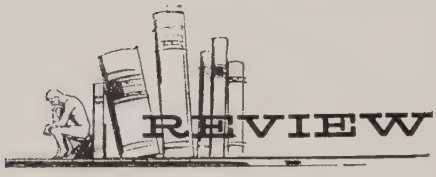
New programs were started in India and Ecuador in 1966, and SCS will soon have five technicians stationed in Vietnam for an 18 months' period.

In addition, SCS provided training in the United States for 429 visitors from 52 countries throughout the world, who spent a total of approximately 5,000 man-days at field locations and in the Washington headquarters.

Operations improvement

The Soil Conservation Service accomplished cost reductions of $9,972,000 in its Washington and field operations and diverted the savings to other essential uses in fiscal 1966.

The savings were obtained primarily by producing more units of work through improved procedures and organization, resulting in accomplishments equal to the addition of approximately 137 man-years of personnel using the old methods. ♦



Regional Accounts for Policy Decisions. EDITED BY WERNER Z. HIRSCH. *1966. Johns Hopkins Press, Baltimore (for Resources for the Future). 230 pp. $6.50.*

This is a collection of papers and comments presented at the third conference of the Committee on Regional Accounts held in December 1964. It covers results of efforts to investigate regional accounts and information systems helpful in making policy decisions affecting urban, regional, and national planning.

Topics treated are: Urban renewal: objectives, analyses, and information; regional accounts for public school decisions; urban economic development; State planning and development in a Federal system; influence of national decisions on regional economics; criteria for evaluation of regional development programs. Contributors are authorities in their fields. Werner Hirsch, chairman of the committee, is author of the introduction.

Regional accounts, as conceived in this book, are organized systems of information about resources, costs, and returns, in relation to alternative programs for specific regions or problem areas, designed "to improve both public and private decision making."

The papers describe, sometimes at a highly technical level, the construction of such accounts.

The book deserves consideration by more than professional planners. Urban and regional planning efforts affect the entire Nation when the resulting programs are put into effect. This volume provides guidelines in a field where more direction and coordination are urgently needed.—JOHN W. BARNARD, *Resource Development Division, SCS, Washington, D. C.*

Protecting Our Food: The Yearbook of Agriculture 1966. *U. S. Dept. of Agr. 386 pp., illus., $2.50.*

In 416 pages and 105 photographs, the 1966 *Yearbook of Agriculture,* portrays in detail the course of our food supply from the farmer's field to the saucepan on the stove. It describes every stage of safeguarding food from insects, rodents, bacterial contamination, and loss of body-building values.

Of most interest to soil conservationists, perhaps, are the first two articles: "Man's Historic Struggle for Food," by Raymond P. Christensen, and "Our Food Abundance," by Glen T. Barton, both of the Economic Research Service. The first surveys the world food situation in relation to population growth and resources; the other the spectacular productivity of American agriculture.

The rest of the book is devoted to the more specific topics of food protection and distribution.—B. O.

New Publications

Development Potential of U. S. Continental Shelves. *1966. U. S. Dept. Commerce, Environmental Science Services Administration. (About 150 pp.) $1.25.* Report on the Battelle Memorial Institute's study of the U. S. Coast and Geodetic Survey's products and services as related to economic activity in the U. S. Continental shelf regions. The report presents data on mining and petroleum, marine engineering, recreation, health and welfare, transportation, food and agriculture, defense and space, research and development, and other industries.

Plant Ecology of Death Valley, California. BY CHARLES B. HUNT AND L. W. DURRELL. *1966. U. S. Dept. Interior, Geol. Surv. Prof. Paper 509. 68 pp., illus., and with separate maps.* Description of the composition and the vegetation in relation to the environment of plants on and along the gravel fans from below sea level to about 1,500 feet above.

Compound Interest Tables. BY ROBERT MARTY AND DAVID J. NEEBE. *1966. USDA Agr. Hbk 311. 103 pp. $0.70.* For long-term planning in forestry.

Study of Strip and Surface Mining in Appalachia. *1966. U. S. Dept. Int. 78 pp., illus. $1.* An interim report by the Secretary of the Interior to the Appalachian Regional Commission, discussing significance and nature of strip and surface mining, present conditions, effectiveness of past reclamation efforts, public interests and benefits, objectives and costs, and methods of basic reclamation.

Arizona Water. BY J. W. HARSHBARGER, D. D. LEWIS, H. E. SKIBITZKE, W. L. HECKLER, AND L. R. KISTER; REVISED BY H. L. BALDWIN. *1966. U. S. Dept. Interior. Geological Surv. Water Supply Paper 1648. 85 pp., illus.* Discusses water resources of the State, the current use of this resource, and some methods of relieving the present shortage and avoiding a future shortage.

Catalog of Federal Programs for Individual and Community Improvement. *1965. Office of Economic Opportunity. 414 pp.* A description of governmental programs to help individuals and communities meet their own goals for economic and social development.

Department of Agriculture's Role in Resource Conservation. *1966. USDA PA–781. 15 pp., illus.* "The Department of Agriculture's vast conservation activities touch the lives of everyone in the United States." This booklet tells what and how.

Handbook of Federal Aids to Communities. *1966. U. S. Dept. Commerce. 111 pp. 60 cents.* Guide to Federal financial aid programs, technical assistance, and information sources.

Soil Surveys

Lafayette County, Wisconsin. BY BRUCE G. WATSON. *1966. 137 pp. illus.; maps 4 inches to the mile (1:15,840).* Fieldwork by Burel S. Butman, Stuart W. Torrance, John J. Sund, Jr., S. Michael Shivers, Bruce G. Watson.

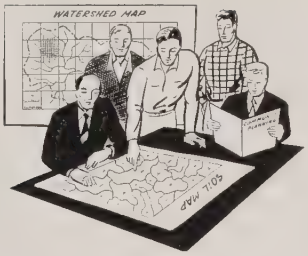
Fountain County, Indiana. BY RALPH H. STURM. *1966. 122 pp., illus.; maps 4 inches to the mile (1:15,840).* Fieldwork by J. Deal, K. K. Huffman, and C. Guernsey.

Elbert County, Colorado, Eastern Part. BY LYNN S. LARSEN, THOMAS G. BABER, E. L. WESSWICK, D. E. MCCOY, AND J. B. HARMAN. *1966. 79 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Rogers County, Oklahoma. BY DOCK J. POLONE. *1966. 65 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

From the Administrator:

Conservationists in Community Planning



THE work of the Soil Conservation Service in the year just past involved conservationists in community planning for economic and social betterment to an extent unmatched before.

An increasing amount of time and talent of SCS field personnel went into consultation with local planning boards, in technical assistance to zoning authorities and land developers, and in helping local leadership fashion practical plans to increase income and improve living conditions in rural communities.

These human welfare goals add a new dimension to the responsibilities of conservationists. It is a worthy trend, to be applauded and encouraged.

Conservationists have much to offer to community development. The proper use and care of land and water resources are the indispensable base of sustained economic growth. But the husbandry of physical resources without relation to human goals is pointless. The deeper involvement of conservationists in community planning is long overdue and needs to be carried further.

For we still are making bad land use decisions.

We still are robbing ourselves of thousands of acres of our best agricultural land to satisfy urban expansion that could be carried out on less fertile acres.

We still are not considering enough the growing need for parklands—for keeping and developing green space—near our crowded urban centers.

We still have not made the necessary effort to relieve the mounting congestion of our cities by establishing more desirable living conditions in properly planned communities in the countryside.

We must be prepared—as conservationists—to anticipate change . . . to adjust to changing national needs . . . to be the forerunners . . . to prepare the way for reasonable and beneficial land use changes that respect the worth of a sound agricultural economy to a productive society, and the value of green acres to the spiritual comfort of our people.

That is the role of the natural resource conservationist. And it is a staggering assignment. As always, we are depending heavily on local soil and water conservation districts to accomplish more with the resources we have.

Our aim is to assure a satisfying and rewarding way of life at every economic and social level.

This development means not only more efficient and more sufficient production of food and fiber for home use and export. It means also the strengthening of the economic base so that the many other material needs of modern society are properly satisfied.

It means the careful planning of resource use and development so that all the people will benefit by the realization of national and regional economic expectations.

It means thoughtful planning so that the waterways will not become polluted and those that now are polluted will be cleansed.

It means that the beauty of the natural landscape will not be needlessly sacrificed in the urgent drive to build for an urban society.

We are working toward building a society in which the quality of the environment will be satisfactory to all of our people as part of the heritage we hope to hand down to future generations. We assure this when our concern is with the landscape as well as with the land. Esthetic values also are a product of nature.

Our task, as conservationists, is to strive for temperance. We are obliged to recognize the inevitability of natural growth, and what this means in terms of changes in land use. Our effort must be to help channel this tide for more constructive development that will benefit the Nation now and into the future.

Conservationists—and the SCS—must accept the responsibility to participate, and to contribute as only we can, to community planning at every level.

We have an assigned responsibility for leading the planning, and for providing technical assistance to Resource Conservation and Development projects, to small watershed projects, and to other formal resource conservation efforts.

New legislation gives SCS explicit authority to make soil surveys and provide soils information in areas of changing land use, as we have traditionally done in farming areas.

SCS has had experience in helping individual land owners and operators plan for proper use and conservation of their soil and water resources.

The elements of sound land use planning are the same, whether the area of concern is a single field, an individual farm unit, a small watershed, a local community, or a broad region. The same kinds of basic resource data, and the same steps of inventory, analysis, comparison of alternatives, and decision making, are required.

Soil conservationists are familiar with these procedures and can supply information needed to use them effectively.

We can expect to devote more of our energy—and rightly so—to community planning.

D. A. WILLIAMS

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FEBRUARY 1967
VOL. 32 NO. 7

Soil Conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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COST RETURN ANALYSIS IN RANCH PLANNING
Page 147

And other articles on Grassland Conservation

SOIL CONSERVATION SERVICE U. S. DEPARTMENT OF AGRICULTURE

Returns . . .

In the practical world of commercial agriculture, major decisions on resource use are of necessity based largely on the operator's expectation of economic return.

Range Conservationist H. L. "Hank" Leithead illustrates (p. 147) how SCS conservationists use a specialized method of "cost-return analysis" to help ranchers find the optimum level of range use for their individual holdings.

Old West: Range conservationists enjoy in their work a special contact with the aura of the Old West, as two reports from our man in Ft. Worth, Sellers Archer, show.

He and Photographer Hugo Bryan last summer met the Centennial Texas Longhorn Trail Drive and came back with scenes (p. 155) reflecting the impact of the cattle industry and conservation districts on the range country.

Then an interview with Cartoonist Ace Reid on his ranch (p. 149) reveals how he is making a conservation showplace of his own piece of beat-out range while building a reputation with knowing portrayals of hardbitten cowmen in equally hard country.

Reid's contribution of cartoons to decorate this issue of *Soil Conservation* is typical of his support of the cause of conservation.

Action: Direct from the field of action is Idaho Range Conservationist Roy Shipley's report (p. 151) on how ranchmen and conservationists reacted at once to heal burned rangeland in the Twin Falls area.

COVER: An SCS range conservationist gives instruction in plant identification to a ranch hand and the owner in the Cody Soil Conservation District of Wyoming. Story on p. 153.

Soil Conservation

Devoted to the wise use of land and water resources

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Increased Production and Conservation

SOIL CONSERVATION is the official organ of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. The printing of this publication was approved by the Bureau of the Budget July 25, 1963.

ORVILLE L. FREEMAN — Secretary of Agriculture
JOHN A. BAKER — Assistant Secretary of Agriculture
DONALD A. WILLIAMS — Administrator, Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service,
U. S. Department of Agriculture, Washington, D. C. 20250

BEN O. OSBORN, Editor — GEORGIE A. KELLER, Production Editor

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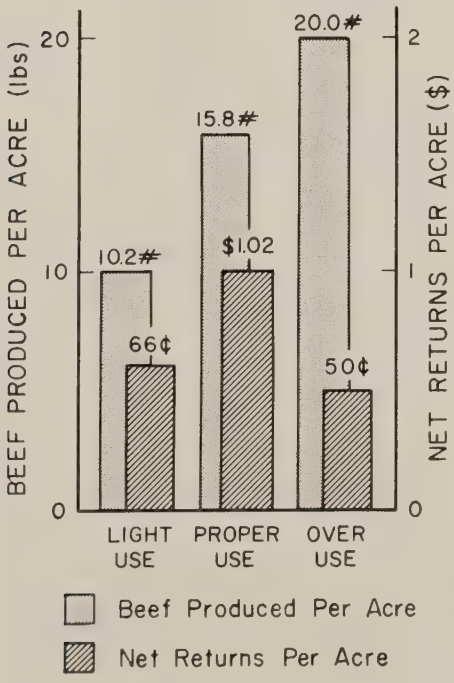
Use of Cost-Return Analysis in Planning Range Conservation

By Horace L. Leithead
Range Conservationist, Regional Technical Service Center, SCS, Ft. Worth, Tex.

Cost-return analyses of several ranches in the Edwards Plateau Land Resource Area of Texas showed that properly used ranges produce highest net returns per acre.

Three degrees of stocking were evaluated: Light, moderate (resulting in proper use of key forage species), and heavy (key species overused).

Overused ranges did produce most pounds of beef per acre but lowest net returns per acre.



Businessmen want to make money, and livestockmen are businessmen. That is why cost-return analysis appeals to stockmen.

This simplified method of cost analysis spotlights the strong and weak points of a livestock operation. It shows how, by applying sound grass and livestock management principles, the operator can cut costs and increase profits. It is a blueprint for a "grass to greenbacks" operation.

Range conservationists of the Soil Conservation Service are using cost-return analysis with individual farmers and ranchers to help them identify profitable changes in grassland management. Almost without exception, good conservation practices on range and pasture are profitable practices for the stockman.

The two essentials of a cost-return analysis are *good records* of the livestock enterprise and good *benchmark data* for the locality.

Two kinds of enterprise records are needed. The first is a record of land and water resources, a regular part of conservation plans prepared by soil conservation district cooperators with the assistance of SCS workers. It includes an inventory of soils and vegetation, indicating the present condition of range vegetation. A land use map shows also the land use pattern, fence locations, pasture acreages, watering facilities, and similar information.

The second kind of record needed is provided by the stockman himself. It includes an inventory of his livestock and current or average figures on production.

Reliable benchmark data are essential for a useful cost-return analysis. They serve as a standard of comparison between the individual farm or ranch and other operations having similar characteristics within a given land-resource area.

Benchmark data

Benchmark information compiled from nearby operations is most effective in motivating conservation changes in grass management. As stockmen in an area study the results of successful neighbors, they develop an "if he can do it, so can I" attitude.

The normal values for various costs and returns for the Southern Florida Flatwoods Land Resource Area shown in the table on the next page are typical of such area benchmark data.

The information was developed from records of well-managed ranches in the area and reflects the kinds of results good ranchers have been getting over the years.

These data apply where the year-long feed and forage program relies on irrigated pangolagrass-ladino clover pastures for all the herd from March to October, and pastures are fertilized twice a year at medium levels.

In this type of operation, a system of rotation grazing is practiced, livestock being moved from one pasture to another after the key forage plants have been properly grazed. Then range or grazable woodlands carry the herd from October or November until pastures are ready to be grazed in the spring, and dry cows are fed from 1 to 1½ pounds of cottonseed cake for 90 to 100 days as

Benchmark Data
Southern Florida Flatwoods Area

Average costs and returns for cow-calf operation using a combination of irrigated pangolagrass-ladino clover pasture and grazable woodland pasture.

Basic livestock information:		
Calf crop weaned	percent	95
Average age at weaning	months	8-9
Average weight of calves sold	lbs.	550
Average weight of cows sold	lbs.	1,100
Annual fixed land costs:		
Taxes, per acre		$ 1.00
Control burning (rangeland), per acre		$ .50
Fences:		
Construction, per mile		$62.00
Maintenance, per mile		$15.00
Pastureland:		
Establishment, per acre		$ 7.95
Irrigation system, amortized in 20 years at 5 percent per acre		$ 4.70
Pasture mantenance, per acre		$13.60
Irrigation 4 times, per acre		$ 3.00
Livestock costs:		
Interest on investment in livestock at 5 percent:		
Cows valued at $150, per head		$ 7.50
Heifers valued at $100, per head		$ 5.00
Bulls valued at $500, per head		$25.00
Horses valued at $200, per head		$10.00
Veterinary service, per head		$ 2.00
Transportation and marketing, per head		$ 1.00
Pickup and other machinery, per A. U.		$ 4.50
Taxes, per A. U.		$ .50
Supplemental protein feed, per head		$ 4.50

a forage supplement.

Cost-return analysis shows this combination of land use and treatment yields a greater net return per acre than operations that depend entirely on improved pasture or on range for their yearlong forage supply.

Other profitable systems for the Southern Flatwoods Area can be worked out to fit the capabilities of the operator's resources. For example, bermudagrass pastures can be overseeded with oats or rye to furnish green forage during winter months. Or fescue can be used in combination with bermudagrass or bahiagrass to provide yearlong forage supply. Surplus forage can be mowed and baled in the summer and fed as hay during the winter. Coastal bermudagrass for summer and lovegrass for winter grazing are a good combination on sandy soils in east Texas.

Where more than one of these alternatives are available, a cost-return analysis can be used to help select the combination that will yield the greatest net returns for a particular farm or ranch.

For example . . .

The case of Dewey Adamson and Son, shown in the following table illustrates this point.

The Adamsons have a timber and beef cattle operation near Glenville, Ga. Although the woods are suitable for grazing, they were not being grazed. The cattle were run on highly fertilized pastures for 7 to 8 months and fed hay the rest of the year.

A cost-return analysis was made of their present system and compared to a proposed system of grazing the woodlands in winter and feeding a protein supplement instead of so much hay.

Changes were also considered in the grazing system for the pasture. By constructing a half mile of fence, a rotation instead of con-

Cost-Return Analysis, Dewey Adamson and Son Ranch

Actual, 1965	Dollars	Proposed plan	Dollars
Gross Income			
117 Calves, avg. wt. 400# at 0.20	9,360	142 Calves, avg. wt. 425# at 0.20	12,070
12 Cows, avg. wt. 900# at 0.14	1,512	14 Cows, avg. wt. 900# at 0.14	1,764
1 Bull	350	1 Bull	350
3 Heifers, avg. wt. 800# at 0.17	408	6 Heifers, avg. wt. 800# at 0.17	816
Total income	11,630		15,000
Expenses on Land and Improvements			
Fence maintenance, 20 miles	210	Fence maintenance, 20 miles	210
Fence construction	0	Fence construction 0.5 mile amortized in 5 yr.	40
Water development	0	Water development	125
Taxes	100	Taxes	100
Maintenance of fire lanes, 30 miles at $13.25	398	Maintenance of fire lanes, 30 miles at $15	450
Pasture maintenance:		Pasture maintenance:	
Fertilizer, 250 acres at $26 per acre	6,500	Fertilizer, 250 acres at $13 per acre	3,250
Mowing, 250 acres at $5 per acre	1,250	Mowing, 250 acres at 2.50 per acre	625
Subtotal	8,458	Subtotal	4,800
Annual Livestock Costs			
Interest on livestock at 5 percent:		Interest on livestock at 5 percent:	
150 Cows valued at $125 per head	937	175 Cows valued at $125 per head	1,093
30 Replacement heifers valued at $100 per head	150	34 Replacement heifers valued at $100 per head	170
6 Bulls valued at $300 per head	90	7 Bulls valued at $300 per head	105
4 Horses valued at $200 per head	40	4 Horses valued at $200 per head	40
Labor, 1 man for 4 mos.	560	Labor, 1 man for 4 mos.	560
Transportation and marketing	532	Transportation and marketing	652
Pickup	500	Pickup	500
Veterinary	190	Veterinary	220
Salt and mineral	18	Salt and mineral	25
Supplemental feed:		Supplemental feed:	
Protein, 8 tons at $70	560	Protein, 15 tons at $70	1,050
Hay, 300 tons at $12	3,600	Hay, 125 tons at $12	1,500
Subtotal	7,177	Subtotal	5,915
Summary			
Estimated expenses	15,635	Estimated expenses	10,715
Estimated income	11,630	Estimated income	15,000
Loss	4,005	Gain	4,285

tinuous grazing system could be practiced. Calves could easily gain 25 more pounds apiece if the calving date were moved back 2 months so they would have longer grazing on the improved pastures.

Fertilizing and mowing could be reduced by half, thus cutting the pasture maintenance expenses in half also.

The cost-return analysis, using the best benchmark data available and average prices for the livestock sold, indicated that the proposed program might be expected to return the Adamsons a net profit of about $4,200 instead of the net loss of $4,000 from their current operations.

Range use vs. overuse

Many stockmen have been reluctant to plan proper use of their grazing land, not because they questioned its worth as a conservation practice but because they thought it would reduce their profit.

It was generally assumed that net returns were earned in proportion to the number of animals per section, or pounds of beef produced per acre. Many operators overstocked because they thought this would make them more money. In reality, they can make more money with fewer cattle on properly used pastures.

Cost-return analyses of ranches throughout the country consistently show that although overused ranges may produce more pounds of beef per acre they usually give lower net returns per acre than properly used ranges.

Cost-return analysis is used primarily to help stockmen plan proper use of their grazing resources and to provide an economical yearlong feed and forage supply. Many stockmen are also finding such analysis an excellent way to measure the yearly progress of their conservation plans. They see that conservation pays in both bigger profits and better range condition. ♦

On the ole Draggin' S . . .

Western Cartoonist Makes Showcase of His Own Ranch

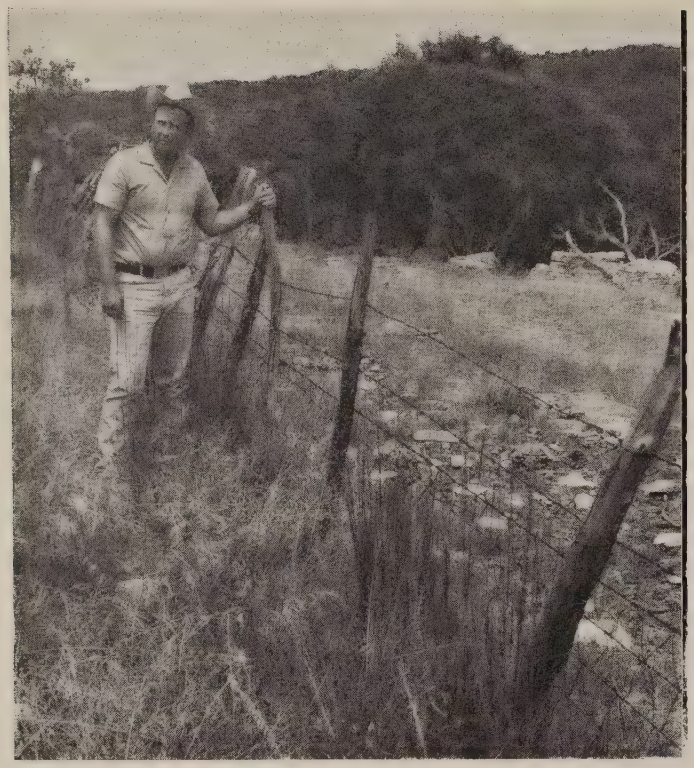
ALTHOUGH Ace Reid, western cartoonist, pokes fun at the hardships of ranching, he is proving on his own place that a good ranch does not consist of barren, rocky, cactus- and brush-infested rangeland on which gaunt cows vainly search for a bite to eat, as he pictures them in his drawings.

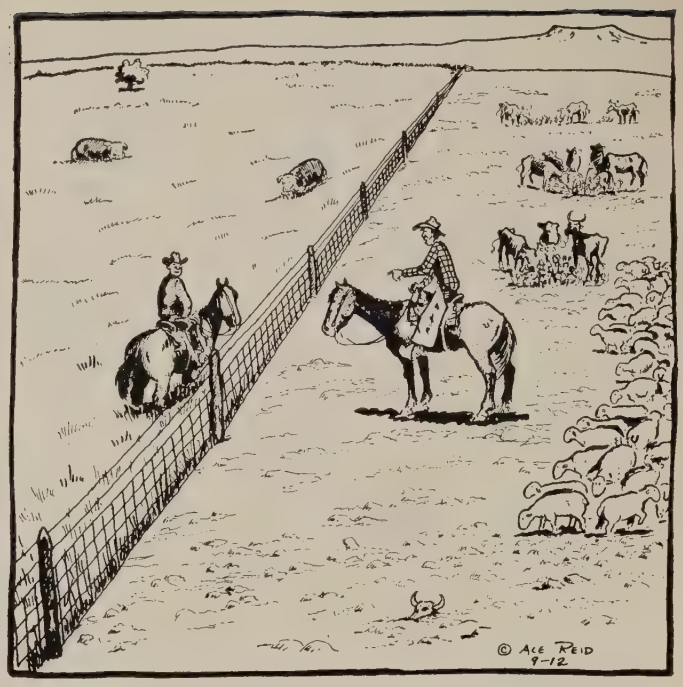
Visit his 350-acre ranch in the beautiful Hill Country of Texas near Kerrville, and the creator of "Cowpokes" cartoons will talk freely about his work—of the cartoons used in more than 300 newspapers and magazines over the Nation, the six "Cowpokes" books which have sold more than a million copies, and the "Cowpokes" calendars moving at 500,000 a year.

But mention the luxuriant grass, the deer, and the wild turkeys you saw along the ranch road as you approached his modern home, and he'll have you in his open-top Scout showing you more of them.

"My neighbors thought that I was a dang fool for buying this

"My grass management is shore good. I've rested this pasture 12 years and already grass is acomin' back!"





"Neighbor, I shore admire yore fence buildin'. It's so tight the grass can't even crawl over on my side!"

A fenceline contrast where Ace Reid's ranch joined a neighbor gave him the idea for one of his most popular cartoons.

rockpile," he says. "They told me it wouldn't grow anything at all. The people who owned it had a big bunch of sheep and goats. There was no grass—nothing but brush and that eaten up as high as the goats could reach."

The Scout bounces along the rocky trails as he tells the story.

"You couldn't even walk where we are driving. There was nothing but cedar—like that." He points to an area of brush that hasn't been cleared. "Under it there isn't a blade of grass and hasn't been for years. I was worried, too, so I asked Sam to come over."

Sam Murrah, former work unit conservationist with SCS at Kerrville, helped him develop a conservation plan on his "Draggin' S" Ranch and sign an agreement with the Kerr Soil and Water Conservation District.

He stops in an area where luxuriant grass grows knee high.

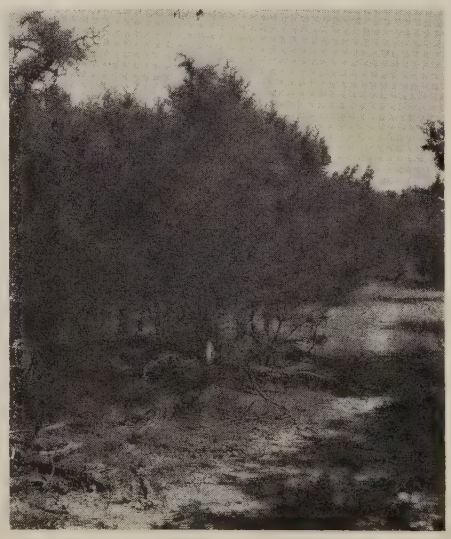
"You can see what we have done, but you can't imagine how desolate it was when we started. First, I planted two fields of Coastal bermudagrass for my horses, but I didn't put any other livestock on the ranch. Every night the fields are full of deer.

"Then we started cutting the cedar with power saws and letting it lie where it fell," he explains. "We killed the brush here just 2 years ago. Look at the amazing way the grass has come back."

He takes you up a steep slope to the flat top of a hill and drives through waist-high grass. "All of this Hill Country would be just like this if the ranchers would kill the brush and take the cattle off long enough for the grass to come back," he says.

"Cedar doesn't belong here any-

The Draggin' S Ranch was "nothing but a rockpile covered with nothing but brush" when Ace Reid bought it. SCS Conservationist Sam Murrah (left), who helped Reid make his conservation plan, is recognizable as the soil conservationist in some of his cartoons.



way. About the time of the Civil War an old man rode through here and described this as a rolling plain with scattered liveoak and no cedar at all except along the creeks. Cedar spread over hills about 1890, I think, after cattle had all but destroyed the grass."

The route he takes leads to a property-line fence.

"The fellow who owns that land is one of the ones who gave me a bad time about buying this pile of rock without any grass. Now look who has the grass."

He points with pardonable pride.

"Sam and I looked at this once, and he said 'your fence is so tight the grass can't grow through'—and that gave me an idea for a cartoon."

He stops the car on a slope as he continues his story.

"This whole rockpile will look just like that when I get the brush all cleared out. That's the thing that amazes me—the way the grass comes back when it gets half a chance. This whole country could look like that. It would take some work and good management, but it would pay off big. This land has had 100 years of abuse, and grass won't come back without a little help. It can't be done in a year, either, but we can sure start it any year we make up our minds to rebuild this country."

He makes a final stop on the ridge above the house.

"I'm dropping the brush all around the edge of this little watershed that drains through my yard. It is fantastic how the grass grows on these slopes. It cuts down the runoff, and it makes the springs stronger. One little spring back of my house there supplies us with water for the house, the swimming pool, and for watering the lawn."

On the tour you've seen a half-dozen good springs which keep a good flow through Steel Creek and supply water for several small ponds. You've seen a cabin under towering pecan trees where Reid likes to work as he watches the big bucks stare at him, turkey gobblers strutting in the tall grass, his two big Texas Longhorns, many kinds of wildlife, and occasionally the big-horned Corsican rams that he introduced to the ranch.

You've seen most of this wildlife as you rode along, and you've had a convincing lesson in conservation. You are sure that Reid has discovered the way to restore the beautiful Hill Country of Texas—for profitable cattle raising and what may be even more important, for an outstanding playground that will offer everything from scenic beauty to one of the best hunting grounds in the Nation.

You've seen his conservation showcase and his exhibits of soil, water, grass, and wildlife conservation. And you know why he is so effective as he travels 25,000 miles a year to talk to dozens of cattlemen and other groups telling them his vivid version of the soil and water conservation story.—SELLERS G. ARCHER, *Information Specialist*, SCS, Fort Worth, Tex. ♦

After the long, hot summer . . .

Idaho Ranchers Rebuilding After Major Range Fire

By Roy L. Shipley
State Range Conservationist, SCS, Boise, Idaho

SOIL conservation district cooperators and Government agencies in the Twin Falls, Idaho, area moved promptly to forestall erosion on about 75,000 acres of private and public rangeland that burned in a devasting fire there last August.

The ground had hardly cooled from the 3-day burn before a steering committee of local ranchers and representatives of Government agencies was formed to plan and carry out emergency land treatment.

Eighteen rancher cooperators of the Twin Falls Soil Conservation District began at once an intensive program of contour ripping, seeding, fencing, and providing emergency land treatment for the 37,000 acres of privately owned land laid bare by the fire.

On public lands, the Forest Service has seeded 17,300 acres and the Bureau of Land Management upwards of 2,000 acres.

The Agricultural Stabilization and Conservation Service provided $80,000 for cost-sharing on seeding, fencing, and water development, and SCS alloted $79,600 for emergency land treatment. The Idaho State Fish and Game Department provided Ladok alfalfa seed for 1,000 acres.

The lightning-caused fire south of Twin Falls started around 3

The pencil points to grass roots exposed by erosion following the fire. (Photo courtesy *Salt Lake Tribune.*)

p.m. August 25 and burned for 3 days on private, State, and Federal land. An unusually dry summer had made tinder of the vegetation, and strong winds fanned the flames. Hundreds of ground fire fighters, aided by chemicals dropped from planes, battled the natural disaster.

Burn severe

The burn was so severe it virtually vaporized trees, large sagebrush, and fences, leaving little but miles of blackened and drifting soil.

In addition to range vegetation, 550 sheep, 600 cattle, 150 miles of fence, several cabins, some farm equipment, and an undetermined number of deer and upland game birds were destroyed. The livestock loss is estimated at $130,000; fence replacement cost at $60,000, and other private property loss at $150,000. Losses to ranchers from forage alone will in the next 3 years amount to more than half a million dollars.

There was no loss of human life.

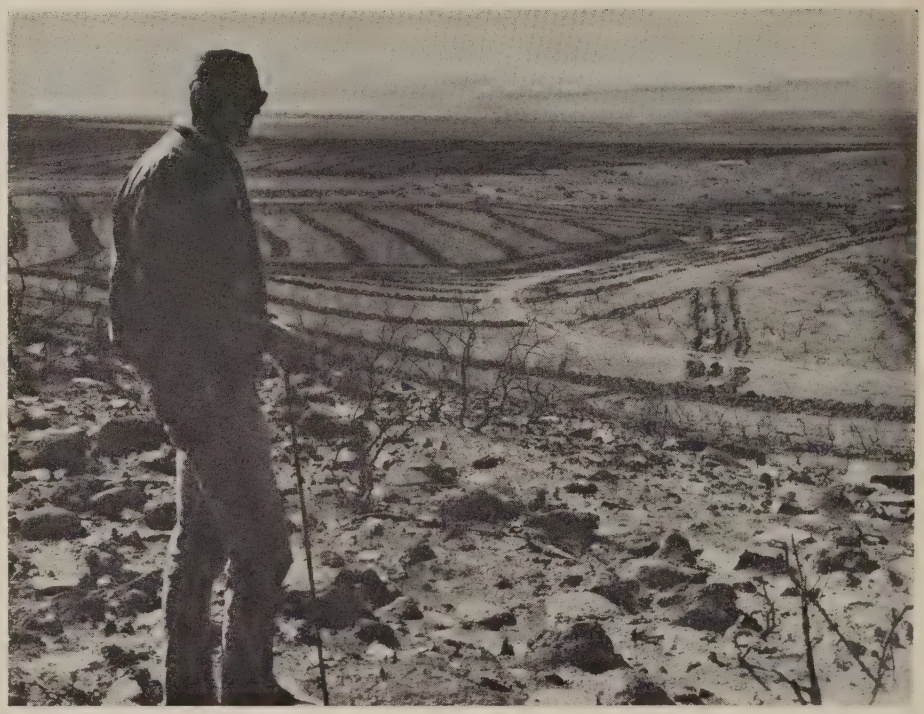
Contour ripping and seeding were begun immediately, and some 36 drills and 17 D-8 Caterpillar tractors and rippers were kept busy through the fall months, so the work could be finished before winter set in.

Twenty-seven thousand acres of the private rangeland was ripped on the contour to hold water and cut the high erosion potential. Contour trenches 30 to 40 feet apart and 18 to 24 inches deep will help to stabilize the soil and keep spring runoff water from carrying away the new seedings.

Several different species of grass were planted, to match the differing soil conditions and amounts of rainfall. The principal ones are Greenar intermediate wheatgrass, pubescent wheatgrass, and crested wheatgrass.

Cooperation does the job

Ranchers in the burn area have expressed appreciation for the complete cooperation of Government agencies in providing technical assistance and funds for the quick rehabilitiation.



SCS Range Conservationist Dennis Froeming (above) looks over private rangeland where ripping is completed. Contours will curb runoff and reduce further erosion damage. Below is one of 36 grass drills used by conservation district cooperators to seed burned range. (Photo courtesy *Salt Lake Tribune.*)

Dennis Froeming, SCS range conservationist, and Clarence Hedrick, SCS work unit conservationist, point out that much of the credit goes to the landowners themselves.

"They asked us what could be done and then organized their own committees," Froeming said. "Not one of them suggested giving up."

Complete soil and water conservation plans have been made by each individual rancher and for each range unit.

The conservation work will reduce potential flood damage to both rangelands and to roads and bridges. Ranchers, conservationists, and the Twin Falls Conservation District are working hard to overcome the financial and land problems in the wake of one of the most disastrous range fires in Idaho history. ♦

Ranch Chores and Nature Study Help Entertain Paying Guests

By Jimmy R. Bell
Range Conservationist, SCS, Worland, Wyo.

SOME of Bob Meyers' paying guests on his cattle ranch northwest of Cody, Wyo., won't forget the chores they sandwiched in with fishing and relaxation.

Youngsters from Urbanville, USA, now can tell their city chums about milking cows and herding cattle—if need be, show 'em.

The Meyers have much to offer vacationing guests. Towering peaks surround the ranch located high in the South Fork Valley along the headwaters of the Shoshone River.

To the northwest, moose, elk, deer, mountain sheep, and other native animals roam thousands of square miles of national forest. To the east is the famous old TE Ranch formerly owned by Buffalo Bill Cody.

The crystal clear waters of Ishawooa Creek flowing out of the mountains provide guests with excellent trout fishing. In summer wild flowers grow in profusion.

For 5 years the Meyers have successfully operated a guest ranch during summer and fall. They built and modernized several cabins, and they maintain an atmosphere of real western hospitality.

In 1962, the Meyers joined the Cody Soil and Water Conservation District and, with the help of the Soil Conservation Service, developed a conservation plan that included such practices as range management, proper range uses, and stream-channel improvement.

During the planning stage soil conservationists provided some unusual services and learned much about guest ranching that others planning such ventures might want to know.

Most important, according to the Meyers, a guest ranch operator must like people and have the ability to make them feel at home.

Next, the guest must have something interesting to do, and this is not always easy. The Meyers found that simple ranch chores often give real entertainment for guests. Children, especially, enjoy milking cows or helping move cattle.

A saddle and harness shop, such as the Meyers have, and the rustic old wagons and carts common around most ranches fascinate many guests. Some favor activities such as fishing or horseback riding; others like to relax and wander about the ranch. Most guests want to know about the things that live and grow in the area.

SCS conservationists can offer many types of assistance that help guest ranch operators learn about nature and pass along the information to urban people.

They recommended to the Meyers books for identifying local wild flowers and showed them how to collect and mount plant specimens and how to photograph plants.

The ecology of various plants provides fascinating information, often of significance to conservation. The Meyers were surprised to learn, for example, that poisonous plants like the larkspur and death camas grew on the hillside near the ranch headquarters because concentrated grazing there had weakened the original grass cover.

The Meyers enjoy their guest ranch operation. Guests are not considered customers but new friends, and the Meyers' correspondence grows each year as old guests want to know of the happenings at the ranch. One little girl writes regularly to the horses she rode during her stay.

With the ever-increasing demand for recreation from America's exploding population, guest ranch enterprises will expand, and more conservation information will be needed. ♦

Ranch guests enjoy chores like feeding cattle and cleaning stables.

New Forage Supply on Red Mountain Ranch

THERE'S a new and better look to the Red Mountain Ranch in Eagle County, Colo., since Owner Carl Lloyd and Manager Jim Ross have applied their range conservation plan.

About 5,000 acres of the ranch is high-producing open sagebrush and aspen range. When Lloyd bought the land, two-thirds of the plant growth was low-quality species, unusable as forage for cattle, and there was a shortage of livestock water and adequate fences.

Lloyd and Ross became cooperators with the Eagle County Soil Conservation District shortly after it began. They developed a plan, updated last year, for sagebrush and rabbitbrush control, deferred grazing units, new fencing, planting alfalfa and grass for hay, and improvement of wildlife habitat. Nearly 2,000 acres of range was aerially sprayed to reduce sagebrush without increasing rabbitbrush. The mountain range is being fenced into four grazing units, each of which can be deferred during the critical summer growing season every other year.

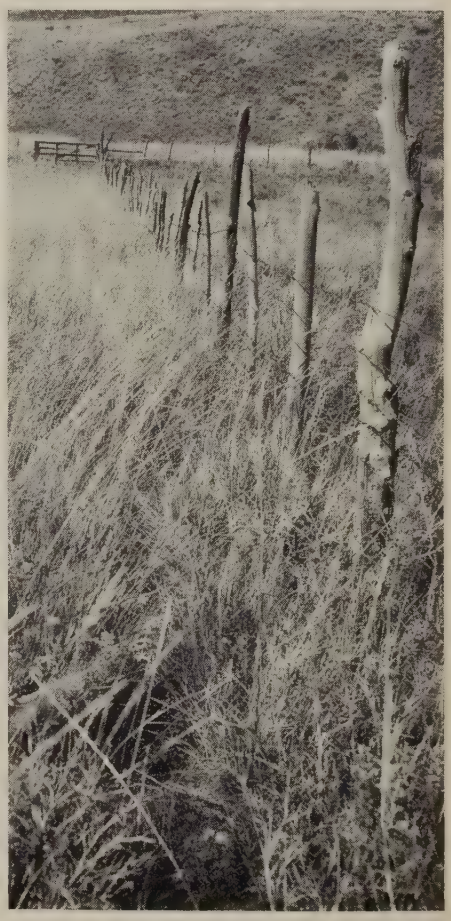
Water development, a particularly difficult problem, is also being worked on. With more cover on the soil, there is now little or no surface runoff.

The range improvements have showed up in better returns at marketing time. Says Jim Ross, "The calves were heavier than ever last fall."

Jim adds, "The range is several times better pasture than when we came 16 years ago."

Like many other ranchers, Carl Lloyd and Jim Ross have found that a good conservation plan stressing proper use of grass with brush control is a highly desirable substitute for trying to buy more land at today's high prices.—DONALD R. ROBERTSON, *Range Conservationist, SCS, Glenwood Springs, Colo.* ♦

Carl Lloyd, owner (left), and Jim Ross, manager, examine their conservation plan map on Lloyd's Red Mountain Ranch. Rabbitbrush dominates mountain valley range site in fair condition (left, below). Mountain loam range (right) has improved to good condition after being sprayed with herbicide to kill the sagebrush. The pasture to left of fence has been deferred during the growing season.



Longhorns Retrace Grassland Trail

LONG, rangy, tough, cantankerous Texas Longhorns were free for the taking and taming when Texans returned from the war in 1866 and found their State prostrate and impoverished. Except to feed the family, however, the cattle were worthless.

But far to the north, from railheads in Kansas, the Longhorn could be shipped to a meat-hungry East. An animal worth no more than a dollar or two at home would bring $10, or $20, or even $35, at the other end of the long trail beyond the Indian Territory.

In 24 years 10 million Texas Longhorns and a million horses were driven up the several trails from Texas to Kansas, grazing on the prairie grasses along the way. Texas was enriched by a quarter of a billion dollars.

So began the saga of the cowboy, the romance of the open range, a folklore that is uniquely American.

Last summer three States celebrated the 100th anniversary of the beginning of the era. In 7 days, June 25 to July 2, 93 head of fine Longhorns retraced the long grassland trail from San Antonio to Dodge City. Between short ceremonial drives at historic spots along the way, the cattle were transported in trucks.

The Texas Longhorn Breeders Association of America organized the affair. Several descendants of the original trail drivers, some of them now prominent stockmen and conservationists, joined with other ranchmen and officials of Texas, Oklahoma, and Kansas in commemorating pioneer range history.

Along the way, the modern trail drivers had opportunity to observe the changes a century of farming and ranching had worked upon the landscape.

Not only have towns and highways, farm buildings and fields, grown on the scene, but range vegetation itself has undergone drastic changes.

Ceremonial Points
on the Texas Longhorn
Centennial Trail Drive

June 27. Trail drive past LBJ Ranch; camp on Pedernales River.
June 28. Drive and camp near Old Abilene Town (Tex.)
June 29 Unload at Middlebrook feeding pens near Vernon; drive to Doan's Crossing and camp.
June 30. Drive across Red River at Doan's Crossing led by Lt. Gov. Preston Smith of Texas; greeting on north bank by Lt. Gov. Leo Winters of Oklahoma. Trail drive through Altus.
July 1. Camp on banks of Arkansas River near Dodge City, Kans.
July 2. Trail drive into Dodge City; auction of Longhorns. Saturday night in Dodge City.

The range cattle industry grew and flourished on the original native grasses that covered the hills and plains, often saddle-high.

By 1900 the swelling herds of cattle in the Southern Plains overburdened the grass. Poor management and bad weather eliminated many operators. Homesteaders' fields and fences fragmented the open range and enclosed watering places. It was the end of cattle trailing and the end of a pioneer era.

On fenced ranches and farms, grassland deteriorated further under too-heavy trampling and grazing. Mesquite, cedar (juniper), sand sagebrush, and other woody invaders came in as the grass went out. By the early 1960's four-fifths of Texas' once luxuriant grasslands were infested with woody plants.

The riders on the centennial trail drive, however, were of a generation of ranch owners that had seen the damage to the land and are helping to repair it.

Grassland restoration and management have been a growing part of the soil conservation movement

The first leg of the centennial Longhorn drive was through the Texas Hill Country (above) past the LBJ Ranch. The original trail drivers found these hills covered with grass stirrup-high and so free of brush that game and livestock could be seen for miles.

When the 20th century Longhorns were assembled at Doan's Crossing (above center) they were almost hidden from the horsemen by tamarisk. In pioneer days the sandy banks of Red River were covered with tall grasses. Continued concentration of livestock at the historic trail crossing set the stage for invasion of the brush.

Raymond K. "Kenney" House (center at right) successor to fabled Wyatt Earp, Bat Masterson, and Doc Holliday as marshal of Dodge City, met Texas Rangers (left to right) Dudley White, Jimmie DeLesdinier, and Ed Gooding as the drive prepared to break camp at Doan's Crossing.

After ceremonies at which Oklahoma's Lieutenant-Governor Leo Winters met his Texas counterpart, Preston Smith, at the State line, the horsemen drove the herd down the bank and across the Red River sands where an estimated 6 million cattle headed north across Oklahoma in the old trail-drive days.

that gained momentum following the Dust Bowl days of the 1930's.

Soil conservation districts now include all of Texas (except the King Ranch), Oklahoma, and Kansas. Cooperators in these three States have established proper range use on 60 million acres of rangeland, have removed or controlled invading brush from 20 million acres, and have seeded 5 million acres of range.

These are only examples of range conservation practices that are restoring the grass on today's farms and ranches. The entire route of the centennial drive is within conservation districts, and participants at many places saw grass even better than the pioneers knew. ♦

Modern ranch owners in soil conservation districts are reclaiming deteriorated range from brush invasion and restoring the orginal grasses with good management. Sand sagebrush has been shredded twice in the pasture on the left (upper right).

The Great Plains Conservation Program has helped landowners reseed cultivated land to permanent grass, improve rangeland, and stabilize the economy of the arid Southern Plains. At right, Ranchman Robert Orr (in white cap) shows the Wilbarger County GPCP Committee the indiangrass seeded on cotton land converted to livestock farming.

Herbicides sprayed from airplanes (below) have been used successfully and safely to kill sand sagebrush and other invading shrubs. A 2-year-old grass planting (right) of switchgrass, indiangrass, and little bluestem recreates a scene like the original sandyland range near Doan's Crossing.

Resort Area Gets Soil Survey to Guide Building

Jackson planning board members see the internal features of one of the town's important soils in a roadcut exposure. Left to right (above) are Frank Vieira and Sidney Pilgrim, SCS soil scientists, and board members Peggy Frost, Richard May, and Jacky Jones. Gully erosion (below) is evidence of runoff problems on the Marlow soil in a Jackson subdivision. The snowy peak in the background is Mount Washington.

CROWDED by a booming summer resort development, a small mountainous town in New Hampshire put up funds to accelerate its soil survey and became the first in the State to be equipped with this necessary guide for orderly expansion.

Jackson has a permanent population of less than 400 people, but its popularity as a summer resort gives it a seasonal increase of 5 to 6 times that number. In addition, winter ski visitors to the surrounding White Mountains are increasing, and a year-round housing boom has begun.

Having seen the results of unplanned expansion elsewhere, Jackson officials felt they wanted all the information possible about their land, so they arranged for the soil survey. They realize that land use decisions made in the next few years will have long-lasting consequences.

The town put up $800 to help pay the expense of the survey by the Soil Conservation Service working through the Carroll County Soil Conservation District. The mapping was completed only this year, but already it has proved useful. Interested home builders have used soils information in buying their land. And a vacation home developer has planned his tract of land after close study of the soil map. Officials feel that the survey is a valuable tool in planning for healthy, profitable growth.—SIDNEY A. L. PILGRIM, *State Soil Scientist, SCS, Durham, N.H.* ♦

Multiple-Purpose Projects

Experience in hundreds of localities demonstrates that multiple-purpose small watershed projects are an effective means for rural and urban communities to deal with land use and water problems.

Arizona Ranchers Praise Results From Use of Irrigated Pasture

By Leon Kimberlin
Conservation Agronomist, SCS, Phoenix, Ariz.

"IRRIGATED PASTURE is one of the best crops we can grow!" say John Olsen and Louis Fornara, partners in the JCJ Ranch in Big Chino Valley near Prescott, Ariz.

Both Olsen, an executive committee member of the National Association of Soil and Water Conservation Districts, and Fornara, can speak with the authority of practical experience. Their pastures have been outstanding in producing forage for beef cows and calves, beef yearlings, and replacement dairy heifers.

The JCJ Ranch has about 600 acres of irrigated farmland; the balance, approximately 1,000 acres, is native rangeland. The ranch is about 5,000 feet above sea level and has an average annual rainfall of 12 inches. Irrigation water is supplied by wells. All crops grown on the ranch are fed to livestock.

The JCJ pasture program began in 1958, when the Soil Conservation Service recommended tall wheatgrass and sweetclover for a 30-acre field which had been unproductive because of an alkali soil condition. The new seeding grew exceptionally well, and the grazing it furnished the following season created interest in more pasture planting. By 1960 the partners had established tall wheatgrass in an additional 70 acres and where planning continued expansion of pasture acreage.

Irrigation improvements

The basic conservation plan for the ranch was revised. Some of the land which had been used for corn silage, small grain, and hay was converted to irrigated pastures. Improvements in land leveling, concrete ditch lining, and irrigation structures were scheduled to keep pace with the pasture planting program. By 1963, an additional 200 acres had been seeded to Goar's fescue and narrowleaf birdsfoot trefoil.

In Big Chino Valley, the irrigated pasture grazing season extends from May through October. Pastures on the ranch are managed in a rotation grazing system. Each pasture is grazed 2 to 5 days, with 20 to 30 animal-units an acre, and then given about 28 days for regrowth. Cattle are moved into a new pasture when the grass has been grazed to a height of about 3 inches for Goar's fescue, and 8 inches for tall wheatgrass.

As soon as the cattle are moved out of a field, it is fertilized with nitrogen and irrigated to speed regrowth of the forage. A second irrigation is usually required before the next grazing. A minimum of 120 pounds of nitrogen and 40 pounds of P_2O_5 an acre is applied each year.

Olsen believes 10 or more fields are needed to get the best results

John Olsen of the JCJ Ranch and Walt Jefferson, SCS conservationist, check Goar's fescue and birdsfoot trefoil after a week of regrowth.

Olsen and son Mike use siphons to irrigate pasture immediately following grazing and again during the regrowth period.

Louis Fornara, JCJ partner, checks dairy replacement heifers at the feed troughs. Hay and corn silage are grown for winter feed.

from rotation grazing.

"Concentrating the cattle prevents uneven grazing," said Olsen.

"It practically eliminates the need for clipping pastures, and manure is evenly distributed," he added.

"Fences have to be well maintained," said Fornara, "but moving the cattle from one field to the next is not much of a problem. They soon learn to go to the next field when the gate is opened."

Pasture records are kept by the JCJ partners. Yields of up to 260 animal-unit-days an acre for a grazing season have been recorded for the tall wheatgrass. Goar's fescue drilled in alternate rows with birdsfoot trefoil has yielded up to 800 animal-unit-days. Steer gains up to 2 pounds a day have been checked.

Needless to say, the partners favor the Goar's fescue-birdsfoot trefoil mixture. However, they are quick to emphasize that tall wheatgrass has paid its way and has done a good job of soil conditioning.

Olsen and Fornara are convinced the success of irrigated pastures hinges on several important factors: Careful attention to the correct methods of seeding and establishing adapted grass and legume species; good fertility management; adequate and timely irrigation; and proper use of the forage through adequate stocking rates in a rotation grazing system. ♦

Idaho Farm Becomes Conservation Showcase

A complete face-lifting job on the 160-acre Fiala farm northeast of Jerome, Idaho, serves as an inspiration to neighboring farmers. The farm is operated by Roger Fiala and his father and includes a good cropping system, water management and control, residue use, and fertility management.

When the farm was purchased in 1930, there were 22 individual fields in different shapes and sizes and 6 headgates and delivery ditches to furnish irrigation water. Shortly after the North Side Soil Conservation District was organized in 1946, the Fialas requested assistance in developing a complete farm plan.

Through a land-leveling program, the entire area was worked into 10 rectangular fields with uniform lengths for irrigation water management. Underground pipelines requiring only 1 headgate replaced seepy earth ditches. Small valves on the pipelines bring water to the surface for each 10 corrugations.

Water is applied so there is no soil erosion and a minimum of waste. The pipeline system is arranged so waste water from the neighbors can be used on one-third of the farm to supplement the decreed water rights.

The main crops grown are alfalfa, potatoes, and small grain. The rotation of alfalfa for 2 years, potatoes for 1 year, and small grain seeded with alfalfa is followed without a break.

Potatoes, the main cash crop, are cared for constantly through the growing season. A soil thermometer checks for time and amounts of irrigation water needed, and only the amount needed to refill the soil profile is applied. This is controlled by the pipeline and valve system.

As an additional bonus, there are no noxious weeds on the farm, since Mr. Fiala can cultivate or spray up to the field and property boundaries with ease.—George James, *Work Unit Conservationist, SCS, Jerome, Idaho.* ♦

Rural Electrification Loans

Twenty-nine loans approved by Rural Electrification Administration will enable REA borrowers in 20 States to furnish initial electric service to more than 14,000 rural consumers.

Loan funds totaling $17,582,000 will finance construction of 1,746 miles of distribution line, 101 miles of transmission line and extensive system improvements including 17 substations and additional headquarters facilities in Alabama, Arkansas, Colorado, Idaho, Illinois, Kentucky, Louisiana, Minnesota, Mississippi, Missouri, Montana, Nebraska, New York, North Carolina, Oklahoma, Oregon, South Carolina, Texas, Vermont, and Virginia. ♦

Conservation Farming With District-Agency Help

IN 3 YEARS, Joe Montgomery, a Negro cooperator of the Escambia County Soil Conservation District, Brewton, Ala., has built a profitable farming operation by using agency help available to him and basing his program on sound conservation practices.

With Farmers Home Administration ownership loans he bought 78 acres of rundown unproductive land in 1962 and 53 acres in 1963, and immediately applied for assistance from the district. Besides this acreage, he farms 180 acres of rented land. He began at once to establish his conservation plan.

Mr. Montgomery built more than 7,000 feet of parallel terraces, seeded 0.7 acre of waterways, planted 2,000 feet of field borders, and dug 600 feet of field ditches with technical help from SCS and ACP cost-sharing.

Joe Montgomery (left) discusses his year's plans with Escambia County Conservation Technician H. W. Hardee and Work Unit Conservationist E. L. Norton.

He points all his farming operations toward producing better grazing and feed for his 100-cow-plus, high quality beef herd. Planting 41 acres of Pensacola bahiagrass and 40 acres of millet for summer grazing, 200 acres of oats and crimson clover for winter grazing, and supplementing winter pasture with dry rations of oat-hay and corn and cottonseed meal are some of his operations. In the spring he cuts all the hay he needs for forage and is still able to turn under a good growth for green manure.

Joe Montgomery fertilizes according to soil test recommendations, and he believes it takes both good conservation and fertilization to make a farm pay. Last year he produced 58 tons of soybeans from a 40-acre field, and about 10 acres of cotton and 23 acres of corn also produced well.

Montgomery's wife is a school teacher and helps on the farm. With her and his father's help, he built several miles of new fences and a concrete-floored metal feed storage barn.

A. R. Fouts, FHA county supervisor, and H. W. Hardee, Escambia County conservation technician, say that Joe Montgomery has done as much, with the resources available to him, as any farmer in the county. He will continue his conservation work this year by building another 12,000 to 15,000 feet of parallel terraces. ♦

Left—While FHA Supervisor A. R. Fouts (center) looks on, ASCS Office Manager C. W. Hillman (left) explains ACP program to Joe Montgomery. Right—Joe Montgomery feeds his fat steers.

New Jersey Nature Center Is Legacy for Neighbors

SUSSEX WOODLANDS, in the Northeast Jersey Soil Conservation District, N. J., is being developed by its owner, Fred Ferber, as a legacy for the people of the greater New York area.

This legacy is not money or tangible assets but a place to relax, be close to nature, enjoy the cool shadows of a woodland, take pictures, or just watch the wildlife that abounds. He is creating a nature center.

Mr. Ferber came to this country from Austria in 1931 and established himself in the manufacturing world as a toolworker. He, later, pioneered the development of the modern ballpoint pen.

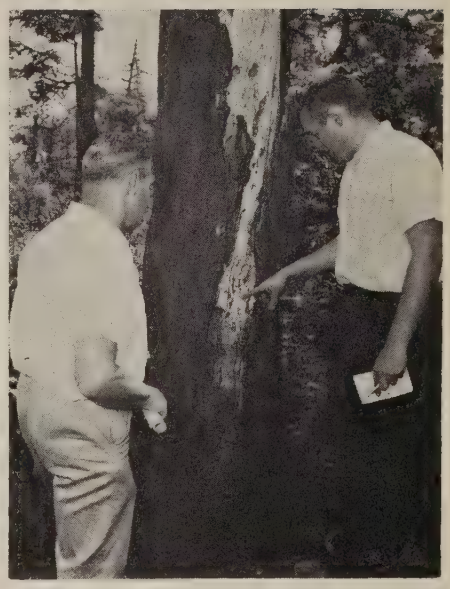
He had become interested in wildlife conservation in Austria, where he and his wife were members of a nature conservancy. In 1959, he acquired a 3,300-acre tract located in Passaic and Sussex counties near the communities of Vernon and West Milford, N. J.

Ferber obtained assistance from the Audubon Society in the early stages of planning for the nature center. Then he asked the Northeast Jersey District to help implement and enlarge the plan.

The Soil Conservation Service assisted in planning an 11-acre lake with water-level control to provide a habitat and feeding area for waterfowl. Areas were planned to provide food, cover, and water for upland game birds and song birds and for the many mammals, including black bear, deer, squirrels, and chipmunks.

Trails to and from the wildlife areas are located to minimize erosion and maintenance. Fertilizer and lime are used with seeding mixtures—designed to give protective cover despite the shade and heavy traffic.

Foresters of the State Forestry Bureau are planning woodland management to complement the center's wildlife and nature study program. Firebreaks will be established throughout the entire tract.



Lester Alpaugh, resident forester of Sussex Woodlands, Inc., points out to owner, Fred Ferber, the insect activity taking place in a dead tree.

Also, small open spaces are planned in wooded areas to provide food, cover, and nesting sites for wildlife.

The Audubon Society's original plan called for the layout and design of buildings and operation of the center.

Mr. Ferber has many uses in mind for his area, including research facilities for colleges, outdoor laboratories for school groups, rehabilitation for the handicapped, and opportunities for people to spend pleasant hours observing nature.—ROBERT A. SIDNER, *Work Unit Conservationist, SCS, Morristown, N. J.* ♦

Bob Myers (right), a New York Soil Conservation Service biologist, explains the relationship of open field and woodland to wildlife habitat. Listening are (left to right) Thomas Crebbs, SCS biologist; Fred Ferber, owner; and Lester Alpaugh, resident forester.

Districts Subscribing to *Soil Conservation*

Michigan soil conservation districts are using many ways to increase circulation of *Soil Conservation* Magazine. Some districts provide subscriptions to schools, doctors, lawyers, dentists, and conservation camps. One district sent letters to 64 doctors, lawyers, and dentists telling them that because of their interest in soil and water conservation the district was donating the subscriptions. ♦

Scout Ranch Gives Boys Experience

A CONSERVATION plan on the Flaming Arrow Scout Ranch gives the boys a chance to learn while they work.

About 15 miles north of Bozeman, Mont., the 432-acre Scout Ranch is located high in the Bridger Mountains.

Soon after the application was made for a basic conservation plan, the Gallatin Valley Soil and Water Conservation District Supervisors gave it high priority, and SCS technicians assisted in planning the needed vegetative and water control practices.

The Scouts started working on the planned practices. They seeded grass on bare areas and cleared a portion of the area of dead trees. To prevent killing out the vegetation, each week they rotate campsites. They are developing and piping spring water to the troop camp areas.

Much of this work came about as a result of the supervision of Ernie Loy, who works for the Yellowstone Valley Council and is director of the Scout Ranch.

He believes that Boy Scouts should learn conservation by working with their hands and seeing with their eyes. When he wants to show boys how beavers can build a dam and hold up water in a creek, a troop goes out to a 27-acre wildlife area where they can see where beavers have been working.

The spirit and enthusiasm already generated in getting conservation on the land will make the Flaming Arrow Scout Ranch a showplace of conservation and natural beauty.—KENNETH HARMAN, *Work Unit Conservationist, SCS, Bozeman, Mont.* ♦

Flaming Arrow Scout Ranch offers Boy Scouts "on-the-ground-conservation" experience in a beautiful setting.

Urban Land Use Planning Policy

THE WASHINGTON State Soil and Water Conservation Committee has taken a positive position committing conservation districts of that State to concern themselves with land use problems in urban areas by adopting the following "Policy Statement on Land Use Planning:"

"Recognizing that America's rural population is decreasing while its urban population is increasing at a rapid rate,

"Recognizing that urban dwellers are recipients of the products of soil and water resources,

"Recognizing that many complex conservation problems relating to the residential, industrial, and other urban uses of land and water are emerging,

"Recognizing the needs of urban dwellers for land-water-based recreation are increasing rapidly,

"Therefore, in order to maintain a high degree of mutual understanding, support, and coordination of effort with urban people, we, the Washington State Soil and Water Conservation Committee and the 68 soil and water conservation districts organized under RCW 89.08 determine that:

"(1) We shall take the initiative in maintaining close working relations with rural and urban leaders, planning commissions, chambers of commerce, civic groups, and all agencies involved in resource conservation and development;

"(2) That district governing bodies enter into memorandums of understanding with appropriate agencies at all levels which are applicable;

"(3) That the functions, objectives, and services of districts be made known to nonfarm people through news media and other avenues of communication; and

"(4) That all assistance available through districts be made readily available to urban and suburban groups in solving conservation and resource-development problems;

"(5) That conservation districts provide technical data and soil interpretations to county and city planning and zoning boards."

The statement continues with the enumeration of 25 specific actions recommended to implement the foregoing policy. ♦

How Beautiful to Behold

Bales of crested wheatgrass hay dot Westcott's fields nestled at the foot of grim cliffs along the Little Dolores.

NESTLED in a little valley between towering sandstone cliffs, Jack Westcott's grass fields ripple before the gentle summer breeze. Beautiful to behold, but more important to Jack, they are a vital source of income from seed and cattle forage. They represent conservation farming in a rugged, semiarid section of the Southwest.

Soil Conservationist Loren Good examines seed in Jack Westcott's field of crested wheatgrass.

The Westcott ranch is some 30 miles west of Grand Junction in the Glade Park Soil Conservation District, Colorado. Jack, with his wife Joan, and their two small sons, Bill and Wayne, operate 952 acres, of which 286 acres are devoted to irrigated or partially irrigated forage crops and pasture.

They've been on the place only 2 years, but Jack learned quickly to make the best use of his limited supply of irrigation water. Grass fits into his scheme of producing beef, growing seed, and conserving both his land and water. He knows the beauty and value of good grass.

A year ago, he decided that 50 acres of crested wheatgrass should be more lush and vigorous. To remedy the situation, he applied 50 units of nitrogen and 40 units of phosphate an acre. With 2 irrigations, the field yielded 9 tons of clean seed or 360 pounds an acre. He cut the 50 acres of stubble and got more than 3,500 bales of grass hay containing 12.4 percent protein.

Westcott's grass provides more than a cash seed crop and cattle forage. It nails down his soil, helps to prevent sedimentation of the nearby Little Dolores River, and, not the least of all, creates a spot of real beauty in an area of otherwise rather drab but rugged country.

Someone once said that grass is God's forgiveness—it heals the ugly scars that man makes in this good earth. With man's help and care, grass can be even more bountiful and beautiful to behold.—DEARL B. BEACH, *Area Conservationist, and* W. S. PALMER, *Work Unit Conservationist, SCS, Grand Junction, Colo.* ♦

Trout Flourish in Maine Watershed Lake

Plenty of fat 12-inch "brookies," weighing more than a pound apiece, are the signs of a dream come true for Mr. and Mrs. Rommy Haines in the Libby Brook Small Watershed Project area at Fort Fairfield, Maine.

Several hundred specimens of one of Maine's favorite gamefish, stocked as 3-inch fingerlings in 1965, have been caught from the 20-acre lake impounded behind the multiple-purpose flood-retarding structure built on the Haines' potato and sugar beet farm.

Haines, a supervisor of the Central Aroostook County Soil and Water Conservation District, was one of the original supporters of the Libby Brook Project. The work was completed by cooperation among local people, State agencies, and the Soil Conservation Service.

One other dam, a diversion channel, a new recreation center at Monson Pond, and intensified conservation land treatment throughout the area are outstanding features of the project. Measures were installed to protect Fort Fairfield from flood damage and to provide better living conditions for the area's people.

The dam on the Haines' farm controls runoff on 90 percent of the watershed besides contributing first-rate angling sport. ♦

Range Youth Camp for Grass Judges

Rancher A. F. "Chink" Beaty (left) and SCS Range Conservationist Fred Whittington (right) help Beaty's cowhands with plant identification. Young cowhands (left to right) are Kent Hawkins, John McClellan, and Gary Goodwin from Roger Mills, Nowata, and Anadarko counties.

RANCHERS of the Upper Washita Soil and Water Conservation District were hosts for a week early last August to 32 FFA and 4-H Club boys attending the Sixth Annual Range Youth Camp at Cheyenne, Okla.

The boys were members of four FFA and four 4-H Club teams that had scored high in county range and pasture judging contests and in the international contest held in Oklahoma City in the spring.

At the camp, the boys were regrouped under ranch "bosses" and lived in the conservation district's field house on the Black Kettle National Grassland.

In addition to studying grasses and range sites, they spent one forenoon actually working as ranch hands for their hosts—helping to fix fences, riding horses to drive cattle, and the like.

Specialists from the Soil Conservation Service, Oklahoma State University, Fish and Wildlife Service, Forest Service, and local ranchers helped with the instruction. All were Oklahoma members of the Kansas-Oklahoma section of the American Society of Range Management, one of the sponsors of the camp.

After the final contest, and at a banquet provided by the town of Cheyenne, the teams were seated behind their sponsors' brands: The "77" of the C. W. "Speck" Lester ranch, Ray Cole's "H," Harlan Thomas' "IV," C. L. Hickey's "Lazy H over a Bar," A. F. Beaty's "Hat," Bob Green's "G-Bar," and B. L. Eakins' "JB." The JB team was the winner.

The teams attending the camp were from 4-H clubs in Nowata, Logan, Pawnee, and Roger Mills counties, and from FFA chapters at Anadarko, Tryon, Hammon, and Cheyenne.—ALVIN M. CLEMENTS AND FRED WHITTINGTON, *Assistant State Conservationist, SCS, Stillwater, and Range Conservationist, SCS, Elk City, Okla.* ♦

Gully Erosion in U.S.

Soil erosion became a serious problem in America soon after the beginning of modern agriculture. One type of erosion was gully formation. In 1939, there were more than 200 million active gullies in the United States, according to Dr. H. H. Bennett in his book "Soil Conservation," 1939. ♦

REVIEW

A Sand County Almanac. BY ALDO LEOPOLD. *1966. Enlarged edition. Oxford University Press, New York. 269 pp., illus. $6.50.*

This new edition makes a modern conservation classic available again after a period out of print.

With the contents slightly reorganized, and with the addition of selected essays from a later book (*Round River,* also out of print), this book provides a full summary of Leopold's conservation philosophy.

An active consultant of the Soil Conservation Service in its early days, Leopold helped shape its program and philosophy to recognize the inseparable relationship of all land resources.

A Sand County Almanac is perhaps the most eloquent statement in print of the concept of land as the total ecosystem and of the ethic of man's responsibility for its care.—B.O.

The Big Water Fight. BY THE LEAGUE OF WOMEN VOTERS EDUCATION FUND. *1966. Stephen Greene Press, Brattleboro, Vt. 246 pp., illus. $6.95.*

For more than 10 years the League of Women Voters has been a leader among the citizen groups working to find solutions to the complex problems of water-resource use and management.

In *The Big Water Fight* the experiences of League leaders and members throughout the country are summarized in case histories of community action programs, river basin studies, strip-mine control campaigns, and water developments.

Written with usual League forthrightness, the theme of citizen responsibility in water-resource development recurs throughout the book, and any organization or

individual might well use this as a handbook for action.

Of particular help to the average interested citizen is the analysis of the functions and interactions of various Federal, State, and local Government agencies, and the chapter on citizen participation in decision-making processes.

That the League members have made good use of Soil Conservation Service assistance and information is obvious. For anyone interested in present and future local action there are numerous guidelines and sources of help. The book is the most practical survey yet published of actual experiences of citizen groups in action.—KATHARINE MERGEN, *Information Division, SCS, Washington, D. C.*

Guidelines to Planning, Developing and Managing Rural Recreation Enterprises. EDITED BY GEORGE W. CORNWELL AND CARL J. HOLCOMB. *1966. Coop. Ext. Serv., Va. Polytechnic Inst., Blacksburg, Va. 424 pp., illus. $2.*

This publication is the proceedings of the Virginia Outdoor Recreation Symposium held at Virginia Polytechnic Institute, February 10-14, 1964. It should serve as an excellent reference source not only for prospective entrepreneurs but also for resource conservation personnel, financial advisers, and others who work with rural people on income-producing recreation enterprises.—RALPH C. WILSON, *Watershed Planning Division, SCS, Washington, D. C.*

New Publications

Physiographic History and the Soils, Entrenched Stream Systems, and Gullies, Harrison County, Iowa. BY RAYMOND B. DANIELS AND ROBERT H. JORDON. *1966. USDA Tech. Bul. 1348. 116 pp., illus.* This bulletin reports on a study made by the Soil Conservation Service in 1957-60 of the conditions in the Thompson Creek, Magnolia, and Willow River watersheds. It consists of three papers:

The first paper, "Stratigraphy and Geomorphology," discusses the Pleistocene and Recent deposits and the geomorphic surfaces that include the Sangamon, Wisconsin, and Recent surfaces and describes the recent physiographic history of the watersheds.

"Soils," the second paper, covers the soils in Tazewell loess—Monona, Ida, and Dow series—and gives the morphology, distribution, and physical and chemical properties of these soils.

The third paper, "Stream Trenching and Valley-Slope Gullies," gives the findings of the study made of the Thompson Creek watershed to determine the causes and effects of stream trenching and gullying in western Iowa. It also investigated two other watersheds to see if the data are applicable to larger areas.

Effects of Agricultural Conservation Practices on the Hydrology of Corey Creek Basin, Pennsylvania, 1954-60. BY BENJAMIN L. JONES. *1966. U. S. Dept. Int. Geol. Surv. Water-Supply Paper 1532-C. 55 pp., illus. $0.25.* In 1953, the Corey Creek basin was selected by SCS for extensive conservation treatment under Public Law 566. The conservation plan provided for collection and evaluation of hydrologic data by USGS.

During the period 1954-60, there was no significant change in precipitation, total runoff, or direct runoff in either basin. The rate of suspended-sediment discharge decreased in both basins, but the decrease has been greater in the Corey Creek basin.

The application of conservation practices has been an important factor in decreasing the suspended-sediment discharge from the two basins; the most important change probably has been the shift from cropland to grassland.

Natural Resources of Alaska. *1966. U. S. Dept. of Interior. 76 pp., illus. $0.65.* The 15th in the Department of the Interior's series of booklets on the resources of the States follows the pattern of earlier issues.

The description of "The Great Land," its history, people, and resources, is told with an eye to the spectacular and unusual, yet with realism regarding opportunities for settlement and agriculture.

It is pointed out that only 4 percent of homesteads attempted are being used for farming and only about 33 percent of the people who applied for homesteads were able to fulfill the requirements and get title to the land.

The programs of Federal natural resource agencies are briefly described. Included, in addition to the bureaus of the Department of the Interior, are the Alaska Railroad, the U. S. Army Corps of Engineers, the Forest Service, and the Soil Conservation Service.

Aggregate Economic Effects of Alternative Land Retirement Programs. BY NORMAN K. WHITTLESEY AND EARL O. HEADY. *1966. USDA Tech. Bul. 1351. 54 pp., illus.* Information on hypothetical land retirement programs which might aid in controlling agricultural production and in maintaining adequate incomes for farmers of the wheat-feed grain-oilmeal-cotton economy.

Evaporation Study in a Humid Region, Lake Michie, North Carolina. BY J. F. TURNER, JR. *1966. U.S. Geol. Surv. Prof. Paper 272-G. 18 pp., illus.* Evaluation of the mass-transfer and water-budget techniques of calibrating a reservoir for evaporation.

A Rapid Method of Construction Control for Embankments of Cohesive Soil. BY JACK W. HILF. *1966. U. S. Dept. Int. Engr. Monog. 26. 99 pp., illus. $1.* A method of evaluating the compaction of cohesive soils used in construction of earth embankments.

Ground-Water Movement. BY R. E. GLOVER. *1966. U. S. Dept. Int. Engr. Monog. 31. 76 pp., illus. $0.50.* Describes and elaborates on formulas that apply to certain important cases of ground-water movement.

Effect of Snow Compaction on Runoff From Rain on Snow. BY FREDERICK A. BERTLE. *1966. U. S. Dept. Int. Engr. Monog. 35. 45 pp., illus. $0.40.* Reports on the determination of the effect of rainfall on both the depth and water content of fresh snow.

Regional Trends in Water-Well Drilling in the United States. BY GERALD MEYER AND G. G. WYRICK. *1966. U. S. Dept. Int. Geol. Surv. Circ. 533. 8 pp., illus.* Analysis of estimates of the number of water wells drilled in the U. S. during 1960-64.

Students . . . Start Your Career in SCS Before You Graduate. *1966 Rev. USDA Misc. Pub. 714. 4-page folder, illus.* Reasons for becoming a student trainee in the Soil Conservation Service.

Aquatic Weed Control Studies. BY N. E. OTTO AND T. R. BARTLEY, *1966. U. S. Dept. Interior Res. Rpt. 2. 40 pp., illus. $0.35.*

Soil Surveys

Seminole County, Florida. BY ALBERT L. FURMAN AND HORACE O. WHITE. *1966. 83 pp., illus.; maps 3.17 inches to the mile (1: 20,000).*

From the Administrator:

Increased Production and Conservation

CHANGING TRENDS in crop production in the United States pose questions for landowners who have grassland that could be cultivated.

In recent months national agricultural policy has placed less effort on reducing farm output by retiring land from cultivation and given more emphasis to encouraging increased production of certain crops.

Increasing requirements for food to meet domestic needs, supply foreign markets, and provide aid to underdeveloped nations have reduced stocks of surplus crops to the point that there must be concern with assuring adequate supplies in the future.

The combination of higher prices and easing of acreage controls will encourage many farmers to devote more land to the favored crops. Each according to his own circumstances, individual operators will have the choice of shifting from one clean-tilled crop to another, plowing up cultivated grasses or legumes, returning recently retired land to cultivation, bringing new land into cultivation, or increasing yields on land being cultivated.

Such land use shifts will have important effects on both individual and public interests.

The individual farmer or rancher naturally will be guided largely by his evaluation of the economic prospects of the various alternatives open to him. This places a heavy responsibility on soil conservationists and others providing information as a basis for his decisions.

SCS fieldmen can help by making available cost-return information about different crops—including livestock, timber, or recreation where applicable—for different soils; by pointing out the opportunity for increased production on suitable soils; by making clear the erosion and soil deterioration hazards of intensive land use on some soils; and by explaining the conservation treatments needed if the land is used for cultivated crops.

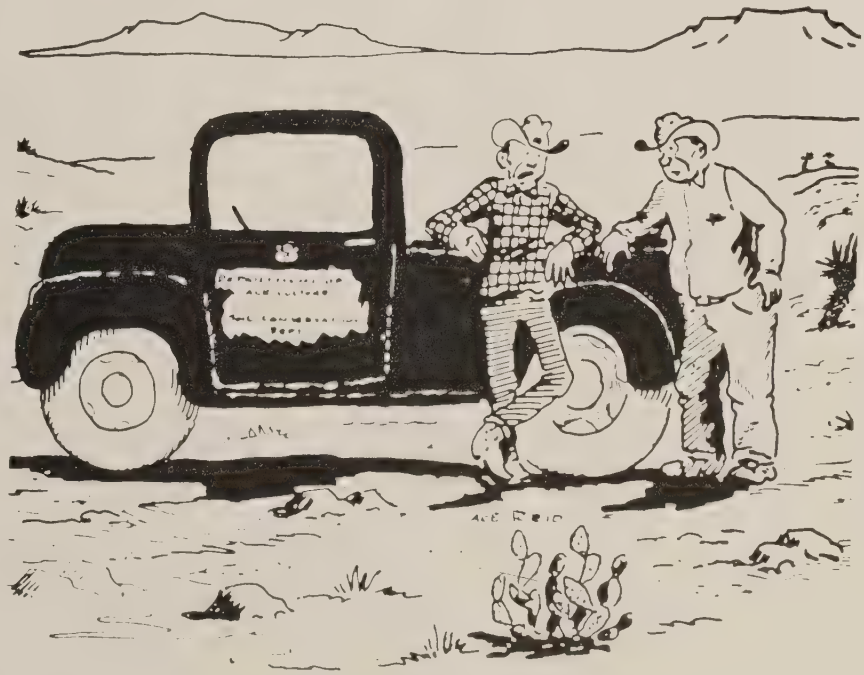
In the public interest, care must be taken to protect the progress that has been made in converting unsuitable cropland to conservation uses. A recent sampling indicated that about one-fourth of the 60 million acres now in the Conservation Reserve and other cropland conversion programs is *not suited* for sustained cultivation and should not be used for wheat or row crops.

To encourage the plowup of land that is marginal for crop production could invite land deterioration and human suffering such as awakened the Nation to the need for conservation in the first place a generation ago. Such an expedient is not necessary, for we have plenty of land that is suitable for cultivation. Increasing the output of needed crops on suitable soil will serve the purposes of conservation as well as meet production goals.

Local soil conservation districts and the conservationists assisting them need to make sure that such hazardous areas are clearly identified and that operators are guided to concentrate crop production on land capable of continued cultivation.

Land use adjustments need to be made to meet the changing needs for farm products, of course. It is equally important that they be made with full consideration for conservation of soil and water resources.

D. A. WILLIAMS



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America The Beautiful—Colorado SHEEP ON IRRIGATED PASTURE

SHAVANO SOIL CONSERVATION DISTRICT

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MARCH 1967
VOL. 32 NO. 8

Soil Conservation

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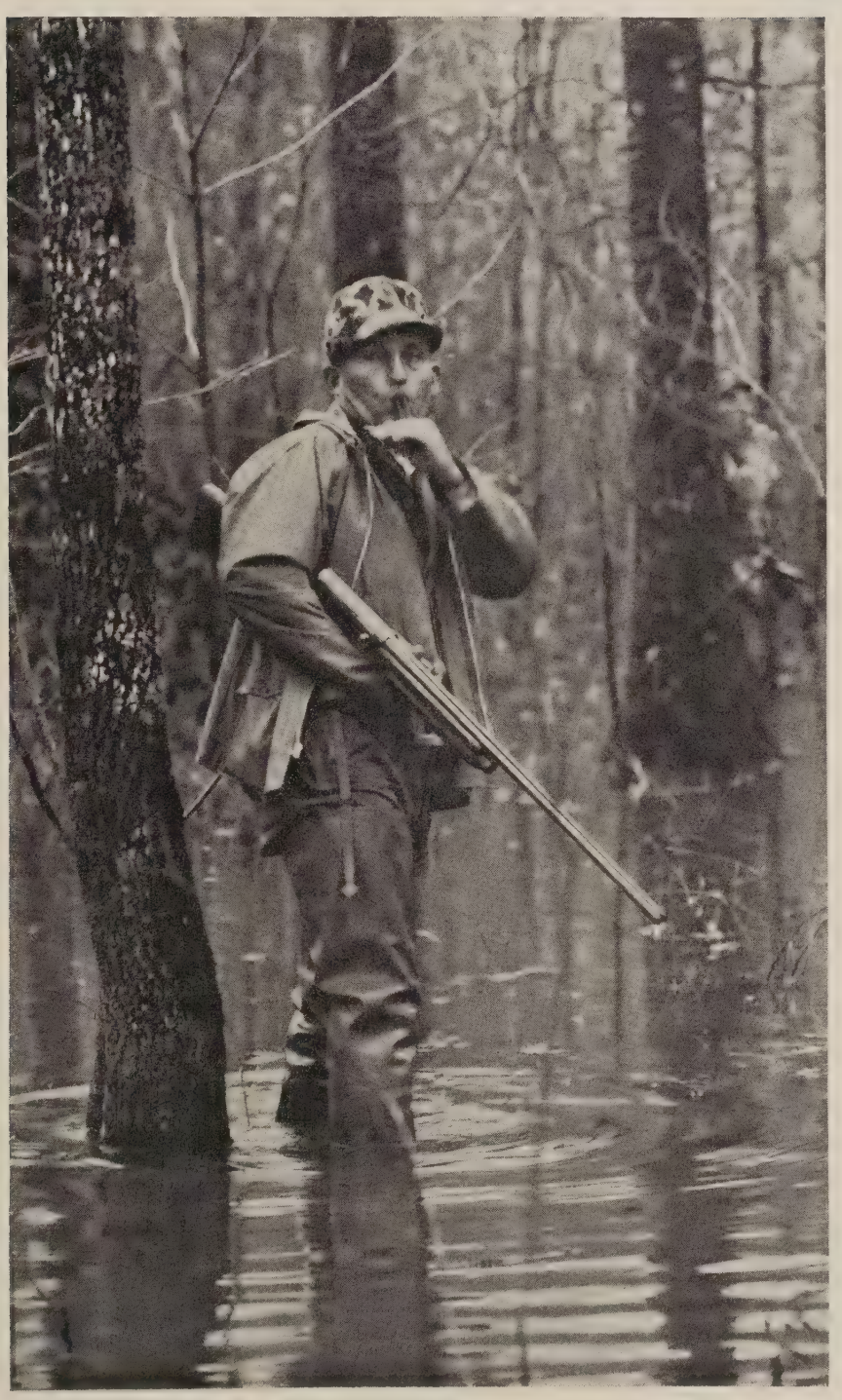

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Human Environment — Page 187

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE

Habitat . . .

What does good wildlife habitat cost?

Few hunters, seeking a place to enjoy their sport, ever ask such a question. Nor do others who hike or drive in the country to enjoy birds and other forms of wildlife.

But abundance of wildlife depends on quality of habitat. And landowners, especially commercial farmers, are guided, consciously or not, by the costs and returns from how they use their land.

We asked Field Biologist Wade Hamor to draw on his wide experience with farm game in the Midwest to make some calculations on this point.

His analysis (p. 171) is only one example, of course, but it gives some measure of the economic forces that shape wildlife fortunes.

New Woodlands: New wildlife habitat will be a byproduct of the new woodlands being planted by Neighborhood Youth Corps crews in North Carolina, described in our center-spread story (p. 180) by State Conservationist Kuykendall. As with most soil and water conservation measures, wildlife and human needs are served by the same efforts.

And People: People need quality habitats, too, and Deputy Administrator Van Dersal sees lessons for us (p. 187) in a British ecologist's report on the amazing complexity of the natural environment. As "Dr. Van" says, biologists take on responsibilty for "nobler game" as they concern themselves with human habitats.

COVER: A hunter calls ducks in a "greentree" reservoir in the Cross County Soil and Water Conservation District, Ark., where wildlife is an important economic resource.

Soil Conservation

Devoted to the wise use of land and water resources
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SOIL CONSERVATION is the official organ of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. The printing of this publication was approved by the Bureau of the Budget July 25, 1963.

ORVILLE L. FREEMAN — Secretary of Agriculture
JOHN A. BAKER — Assistant Secretary of Agriculture
DONALD A. WILLIAMS — Administrator, Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service,
U. S. Department of Agriculture, Washington, D. C. 20250

BEN O. OSBORN, Editor — GEORGIE A. KELLER, Production Editor

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Subscription: $1.75 per year, $2.50 foreign. Single copy, 15 cents. Discount of 25 percent on orders of 100 or more sent to same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D. C. 20402.

Managing Farmland for Paid Hunting

By Wade H. Hamor
Biologist, Regional Technical Service Center, SCS, Lincoln, Nebr.

EVERY FARM can be a recreation area of one kind or another. In today's market, outdoor recreation resources are worth money.

Whether a landowner does or does not use the recreation resources of his farm for economic income is his choice to make. But if he does not, and if the kind of recreation available on his land is in short supply, a good source of income is wasted.

Farmers who are taking advantage of the current demand for hunting space find that their land can return an additional $1 to $5 an acre.

Quality in demand

Quality hunting at a fair price is in strong demand. Quality is found on the farm that offers attractive hunting cover and an abundance of game to hunt.

Hunters, as farmers know, are attracted to the better cover areas. The farmer who manages his land as a fee hunting area will do well to produce as much game as physically possible. It is the satisfied customers that keep a hunting enterprise in the black.

Hunting is considered good on Midwest farms if game numbers reach or exceed the following:

Species	*Number per 100 acres*	*Number per square mile*	*Acres per game animal*
Pheasant (cocks)	13	83	8
Bobwhite quail	33	211	3
Cottontail rabbit	20	128	5

How to do it

How does a farmer keep game numbers at a high level and how much return must he have to break even on the cost of doing so?

The first essential is a conservation plan for the farm, incorporating wildlife habitat improvements that are harmonious with the principal uses of the land.

When the plan is complete, a cost-return analysis of the operation can indicate the amount of hunting and the charges necessary to offset the costs and give the operator a profit.

SCS conservationists can assist conservation district cooperators prepare such plans and make the cost-return analyses.

Game production for economic return is similar in many ways to growing any other crop. High yields of game are not possible every year, any more than it is possible to produce 100 bushels of corn every year, even though the land has the capability to do so. The farmer knows, however, that by using good farming practices he can attain a high average yield of corn. Production of the game crop must be approached in the same fashion.

Sustained high yields of any crop—whether grain, beef, timber, or game—require the protection and efficient use of soil and water resources.

Cultivated fields are terraced, planted on the contour, planted in strips, or otherwise managed to reduce wind and water erosion and obtain maximum intake of water into the soil. Fertilizer and lime are applied in the amounts needed to maintain high soil fertility. Waterways in cultivated fields are well grassed to permit the flow of excess water without causing erosion.

Pastures are grazed so as to leave adequate protective cover. Streambanks are protected against erosion caused by the trampling of livestock. Ponds are fenced and watering places for livestock placed outside the enclosures.

Woodlands intended to produce sawlogs and pulpwood are protected from grazing, or grazed according to a good management plan.

Conservation basis

Likewise, in the development of improved wildlife habitat, the use of soil and water conservation practices is the first step. A complete conservation plan for the entire farm provides the back-

ground for specific measures of benefit to wildlife.

Areas that are intended primarily to produce wildlife are protected from livestock and from undue disturbance by farming operations. Natural vegetation is allowed to grow on them or shrubs and food crops are planted as needed.

Areas of especial importance to wildlife on most farms are the fence rows, roadsides, hedgerows, woodlots, streambanks, odd corners of fields, grassed waterways, and ponds. Wildlife numbers increase when these areas are managed to provide maximum cover. Often, simple protection from livestock is all that is needed to permit the natural growth of grasses, trees, shrubs, and vines.

Waterways must be managed to keep a dense, smooth grass cover to prevent erosion. Such areas are also valuable for wildlife.

As a rule, a farm with 5 to 10 percent of the land in good wildlife cover makes an attractive hunting area. The cover must be well distributed over the farm. Where the amount or distribution is inadequate, it may be necessary to plant additional cover to create an environment that produces game abundantly and consistently and is attractive to hunters.

Costs and returns

The economics of providing hunting for income is illustrated by an example from south-central Iowa. A 160-acre farm for several years had produced an average of 1 cock pheasant per 16 acres, 1 bobwhite per 20 acres, and 1 rabbit per 10 acres. The land is marginal for pheasants but has a high potential for quail and rabbits. "Clean" farming has been practiced for many years, and game cover is scarce.

There are about 3 miles of boundary and field fences on the farm. The average width of the fence rows is 3 feet, and they occupy slightly more than 1 acre of land. A mile of roadside cover occupies another 2 acres. Assorted idle field corners amount to 2 acres and grassed waterways 2 acres. Altogether there is about 7 acres or 4 percent of the farm acreage in wildlife cover. There is a farm pond but it is not fenced, and livestock have grazed the area heavily.

The conservation plan, including wildlife habitat improvement, for this farm calls for the 3 miles of fence rows to be increased to a width of 12 feet. When the widened fence rows are protected, desired trees and shrubs will begin to grow. The farmer may choose to plant multiflora rose or honeysuckle in order to get the desired cover earlier. This would add much of the cover needed by quail and rabbits and would add significantly to the farm's attractiveness as a hunting area. The 9 feet of added width will occupy a little more than 3 acres of cropland.

The farm pond plus an additional acre of land will be fenced to improve the quality of drinking water for livestock and to protect plantings planned for wildlife cover. Eighty rods of fencing is required. Another 40 rods of fence will be built to exclude livestock from assorted field edges and corners. Three acres of grassed turnrows will be established to reduce erosion and to provide additional cover for quail and rabbits.

Ungrazed woodlots develop dense cover of value to wildlife.

The total land to be managed for wildlife amounts to 14 acres, 5 acres of which is in grassed waterways and grassed turnrows and will serve a dual purpose.

Conifers planted in fenced area by pond soon make good hunting cover.

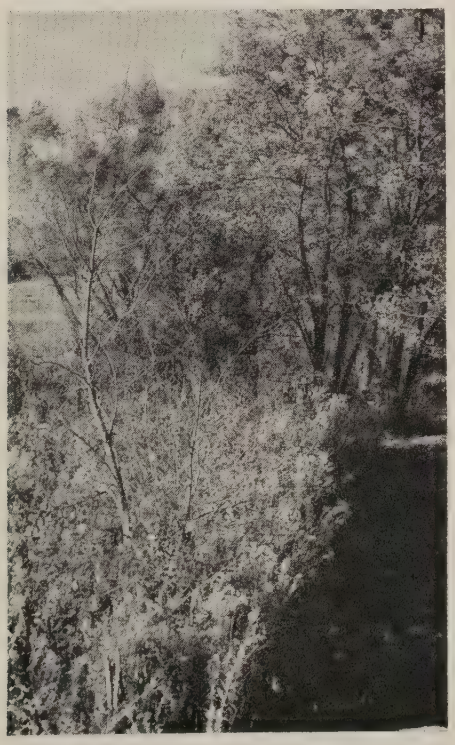
Wildlife Habitat Cost

Cost items	*Annual cost (dollars)*
1. Fence rows: 3 miles widened to 12 feet; planted to shrubs at $0.80 per rod; amortized for 25 years at 6 percent plus 1 percent of original cost for annual maintenance	67.76
2. Fence pond and odd field corners: 120 rods at $3 per rod; amortized for 10 years at 6 percent plus 2 percent of original cost for annual maintenance; one-third of cost assigned to wildlife	18.70
3. Plant 80 rods of shrubs inside pond fence at $0.80 per rod; amortized for 25 years at 6 percent plus 1 percent of original cost for annual maintenance	5.65
4. Planting grass on 3 acres of turnrows at $25 per acre; amortized for 10 years at 6 percent plus 1 percent of original cost for maintenance; one-third of total cost assigned to wildlife	3.65
5. Reduced returns from 3¼ acres of cropland at $20 per acre, from 3 acres of turnrows at $5 per acre, and from 1 acre of pasture at $10 per acre ...	90.00
6. Insurance, advertising, signs, and servicing of hunters	60.00
Total annual cost	$246.00

Considering the types of crops to be grown plus the vegetation planned for the wildlife land, it is thought that the farm will again be highly productive of quail and rabbits and that some pheasants will continue to use the farm.

A "bird's eye" view of a bird hunt on a farm with good wildlife habitat.

Field corners protected from livestock provide valuable game and hunting cover.



The costs of making these improvements are estimated in the table (top left).

Federal cost-sharing through the Agricultural Conservation Program is available in most States to help with the cost of habitat development and if used will reduce the annual costs to the farm.

The annual cost of about $246 for development, management, and operation is the amount the farm must yield in fees from hunters to offset the loss of return from crop and pasture land converted to wildlife use plus the investment in habitat development. Return in excess of $246 will serve as an inducement to maintain a high level of game production.

For the farm described, the number of days of paid hunting required to break even at different rates of charge would be as follows:

Daily fee (dollars)	*No. of hunter days*
5	50
8	31
10	25

The farmer might elect to lease the hunting rights on a seasonal basis to a group of hunters for an amount equal to or in excess of the estimated cost.

It is likely that other species, such as pheasants, waterfowl, squirrels, raccoon, and deer, would also become available and further increase the number of days of hunting produced by good conservation management of the farm's natural resources. ♦

Planted hedgerows, like this multiflora rose, grow fast when given proper care.

Planned Waterfowl Habitat

Conservation practices make Sauvie Island outstanding duck and goose hunting area

By Tom G. Davis
Work Unit Conservationist, SCS, Portland, Oreg.

WATERFOWL management on Sauvie Island, 36,000 acres of improved pasture, intensive farming, game-bird fields, and wetland feeding areas only 14 miles downriver from Portland, Oreg., produce an excellent habitat for ducks and geese and attract thousands of hunters.

Thirty-three Sauvie Island Soil and Water Conservation District cooperators manage a total of 350 acres of planted and flooded "wildlife lands" on privately owned land. They maintain also good waterfowl hunting for themselves, friends, and paying guests on their harvested corn and potato fields.

Waterfowl food planted

Several landowners sow smartweed seeds in most of their lowland fields, dedicated to hunting. The smartweed produces a seed crop after cultivation, and the ducks use it well when the almost-daily fall and winter rains cover the seeds with shallow water.

The Oregon State Game Commission is the soil conservation district's largest cooperator. It manages 13,000 acres on the north end of the island and permits hunting each second day of the season at the nominal charge of $2 a day a person.

In 1965, the commission planted 515 acres of choice foods for ducks and geese, including 242 acres of common buckwheat, 80 acres of field corn, 50 acres of Japanese millet, 18 acres of spring barley, and 75 acres of ryegrass-clover pasture.

In 1966, proso millet was substituted for some of the Japanese millet acreage, and 140 acres of the foods were flooded during the hunting season.

In 1965, the Game Commission's unit provided 9,000 waterfowl hunter-days and a harvest of 15,600 waterfowl. The preliminary records for 1966 indicate substantial increase in hunting pressure and a great increase in bird kill.

According to plan

The Soil Conservation Service provides the district cooperator with technical assistance in building good ponds and planting waterfowl foods in suitable sites with the least expenditure in labor and money. Each plan includes proper locations and elevations of waterways and impoundments, correct structural designs of installations, and information about preferred wildlife food crops.

Soil and water conservation practices of especial value to wildlife established and maintained on the island include 715 acres of

Sauvie Island landowners grow corn for ducks and geese as well as for domestic livestock. Here (left) Tom Davis, SCS work unit conservationist, and (right) Dan Allison, Oregon State Game Commission, inspect the crop. Water-control devices (right) make it possible to drain the land in summer to grow waterfowl foods, then to flood it in the winter so the birds can use the fields as feeding areas.

Two hunters "limit out" at a 7-acre duck pond that is part of a system to provide more than 20 acres of shallow water for duck and goose habitat.

wildlife habitat development, 48 acres of wildlife wetland development, 428 acres of wildlife wetland preservation, and extensive engineering structures to control water levels. In 1965, cooperators converted 368 acres of cropland to primary hunter-recreation land use.

In addition to technical assistance provided by the Soil Conservation Service and Oregon Game Commission, some practices have been cost-shared through the Agricultural Conservation Program.

Duck blinds are installed at proper elevations to give the hunters best cover when the land is flooded to serve as waterfowl-feeding areas.

According to Game Department estimates, the Sauvie Island waterfowl population in 1965 reached a maximum of 116,000 ducks on December 29 and 4,300 geese on December 7. As the hunting season advances, waterfowl numbers usually decline moderately, but the places with the most attractive food and water conditions continue to be the most satisfying areas to hunt—a significant hint to the hunter and land manager.

Experience proves that there is more to waterfowl hunting than just "shooting birds." A planned and developed agricultural habitat produces a better place for hunting ducks and geese. ♦

Resource Conference Is International Forum

"Human Needs and Environmental Limits" is the theme of the 32d North American Wildlife and Natural Resources Conference in San Francisco, Calif., March 13, 14, and 15.

The conference opens on Monday morning March 13 with a general session on "Resolving Resource Conflicts." Wednesday afternoon the second general session "People, Pressures and Progress" closes the conference. The remainder of the 3-day conference is devoted to six technical sessions including one on "Farm and Urban Resources" and another on "Forest and Range Resources."

This international conference has an attendance each year of well over 1,000 persons, principally from the United States, Canada, and Mexico. There is also good representation from Europe, Africa, and elsewhere. Conservationists, administrators, and others concerned with the use and preservation of natural resources will participate in this annual opportunity to exchange and discuss ideas, techniques, and information. ♦

Farmers Find Many Ways to Sell Fishing and Add to Income

By William W. Neely
Biologist, SCS, Columbia, S. C.

YOU probably know a farmer like Burton Gunter of Lexington County, S. C. He sells fishing privileges in his farm pond and thus gets some extra income. Also important, he is providing a place to fish for people who can't own a pond.

There are many other farmers doing the same thing. Local soil and water conservation districts encourage this type of enterprise.

Gunter has other farming activities and can't afford much of his time for supervision of fishing. Therefore he sells fishing privileges on the honor system.

The fisherman writes his name on a provided envelope, inserts a dollar, and drops it into a slit in a locked box for a day or any part of a day's fishing. As you might expect, Mr. Gunter finds that there are a few "dead-beats," but there are not enough of them to be worth the time to enforce the fee collection.

The honor-system ponds have sporadically good and poor fishing. This is because when fish are biting well, a large poundage of fish is taken. The result is a period of poor fishing while the fish grow to take up the slack. So some pond owners set creel-limits. Allen Brigman in Chesterfield County is typical of the pond owners who set creel limits.

If the honor-system ponds are fertilized for maximum fish production and kept free of waterweeds, there are usually enough good catches to keep the fishermen coming even though many go home empty handed or with poor catches. By actual value of meat, the pond owner loses on the big strings of fish, but this is averaged out by the strings with few fish or none.

Even if the catch of fish happens to be poor, however, the fisherman still gets a good return for his money. The Hunt brothers, who have been selling fishing in their ponds in Greenville County for many years, say that many of their customers tell them that a place to spend several hours in outdoor recreation, in pleasant surroundings a short distance from home, provides enough satisfaction to compensate for the fish not biting.

Almost any farm pond can provide some additional income from selling fishing. However, for fee-fishing to be in the "business" category, a more elaborate outlay is needed.

Fisheries research at Auburn University indicates that 15 to 20 acres of water is the minimum size. Water may be in one pond, but it is better for management if there are several ponds.

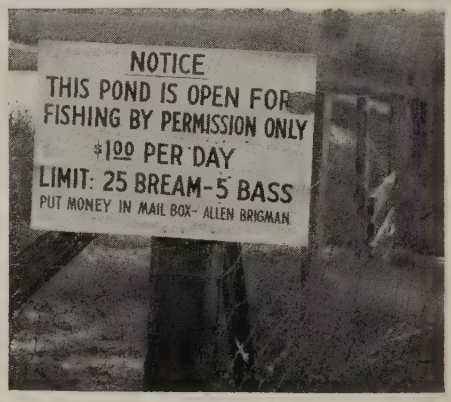
H. K. Purdy, Jr., of Jasper County requires a check-in and checkout in his enterprise. Purdy has about 70 acres of water divided among five ponds which he manages for bass and bluegills. He gets market value for his fish by requiring the catch to be weighed when leaving. He charges an entrance fee of $1.50, which entitles the fisherman to 4 pounds of fish.

Fishing is only part of Mr. Purdy's enterprise. Since someone is required to be on hand for the check-in and checkout, there is a concession stand which sells refreshments, bait, and tackle. Rental boats and launching-ramp fees contribute to the overall income.

Another type of fee-fishing is offered by J. P. Kellett in Greenville County. He operates a "put and take" pond. The pond he uses is about 2 acres in size, since a small pond is desirable for this kind of fishing. The pond is stocked with adult catfish and carp purchased from commercial fishermen.

As an added sales "gimmick," some of the fish are tagged, and a certain tag-number may be worth as much as $10 to the person who

Steve Plyler (above), Lancaster work unit technician, SCS, in South Carolina, illustrates how a fisherman using the honor system writes his name on an envelope before dropping fee for fishing privilege into the locked box. The sign reads "Fishing $1 per man 16 years or over, 50¢ per child or woman." Some pond owners (below) prefer to use creel limits to prevent heavy depletion when fish bite well.



is lucky enough to catch the fish.

Being crowded and hungry, the fish bite readily. Excitement runs high among the fishermen as extra large catfish and carp break poles and snap lines. Only a short fishing-period is allowed for each fee-payment, and it works out that the profit is three or four times the cost of the fish. More fish are added in the pond periodically—perhaps as often as once a week.

"Put and take" ponds such as Mr. Kellett's have been popular and profitable when located near industrialized areas in the Southeast. Some of the ponds are as small as one-half acre.

If you are planning a fee-fishing enterprise, the place to start is with a properly designed pond with suitable water control. SCS conservationists assisting conservation districts can help you.

They can also help with plans to reduce erosion on land draining into the ponds. Muddy pond water slows fish production, reduces the effect of pond fertilization, and is unattractive to fishermen.

In fee-fishing, as with any business, repeat customers make the difference between success and failure. Good pond management is required to insure reasonably good fishing and bring fishermen back. Mowed shorelines give freedom of movement to fishing spots and allay the fear of snakes. Shelters, picnic tables, and a few other frills may make the difference of whether the fisherman comes alone or brings his entire family as paying customers. Much of the management information can be found in USDA Farmers' Bulletin 2210, "Warm Water Ponds for Fishing."

Lately, much publicity has been given to the fast-growing need for outdoor recreational facilities. Fee-fishing can help meet this need. ♦

Backyard Trout Ponds

Commercial fish ponds flourish in midst of Michigan's natural lakes and streams

MICHIGAN landowners are making homes for Tommy Trout in their own backyards.

The Soil Conservation Service reports the demand for trout pond design in soil and water conservation districts of that State at a new high as farm fishing and fish farming soar to new levels of popularity.

Ponds for fun

The biggest demand for ponds is in northern Michigan. SCS Area Conservationist Dean Gordon, at Cheboygan, says 658 trout ponds have been built in his 16-county area, 99 last year. Harold Chase, Traverse City, reports 818 trout ponds in the soil and water conservation districts in his SCS area.

Why are so many ponds built in an area blessed with natural lakes and fresh-water streams?

"People like to have their own ponds," says Gordon. "When they fish from a public stream, someone else is likely to catch the 'big' one."

Most families build trout ponds for their own enjoyment and to entertain friends. But there are commercial ponds in the area, and these have brought added income to this Michigan tourist area.

The Jordan Valley Trout Farm,

One of the seven ponds on the Jordan Valley Trout Farm near East Jordan, Mich.

Owner Russell Hughes watches the fish jump as he flips food pellets onto the water. He operates a fish hatchery, rears the trout, offers public fishing, and sells fish commercially.

operated by Russell Hughes of East Jordan, hatches 30,000 fish a year. Hughes raises the fish in 7 ponds and sells them to restaurants and other pond owners for trout dinners and stocking.

In summer, he lets tourists fish his largest pond in the former barnyard area. They pay $1.30 a pound for their catch, and Hughes cleans the fish free. For $0.10, visitors can feed the fish and watch them jump for the food pellets.

Hughes keeps his 10 incubator trays, three 500-gallon growing tanks, and several cleaning tables in the milking parlor of his converted dairy barn.

Another commercial trout enterprise, although you wouldn't guess it from the name, is Acorn Acres near Bellaire. The business started as a Christmas tree farm.

Acorn Acres sells trout to restaurants as far away as Detroit and Chicago. The operators hatch 400,000 fish eggs a year in 3 spawnings and raise them in 25 ponds.

Everett Ash, a former SCS employee who manages Acorn Acres, says that putting the land under water has made it far more productive. Before, the swampy creek bottoms grazed only a few cattle. Now, the ponds supply tons of fish.

Another farmer who turned to recreation through trout ponds is Phil Servoss, also of Bellaire. He has a contract with the Shanty Creek Resort to supply fish for the resort pond. He hatches 50,000 trout a year.

Fresh water favored

This area of Michigan seems to be ideal for trout ponds. Fresh water seeping out of sandy hills keeps summer stream temperatures below 70°, cool enough for the fish. The continuous flow keeps streams from freezing in winter.

Although a few trout ponds are supplied by water from wells, most owners prefer a stream-fed pond. Well water lacks sufficient oxygen, and the owner must run costly pumps to stir it.

One problem with stream-fed ponds is silt. However, this can be avoided by building the pond alongside a stream instead of letting the creek run through the pond. A settling basin can catch the silt before the water reaches the fish pond. Of course, soil and water conservation on surrounding land helps too.

The minimum depth for trout ponds in the area is 10 feet. For this depth, with gentle side slopes, a pond must be one-fourth acre or larger. A good ¼-acre pond has a capacity for about 1,000 trout.

Residents of northern Michigan use trout ponds to bring in extra tourist money in a variety of ways. One merchant raises trout in his pond and markets them in his store. Another individual has a museum next to his trout pond. Both help to draw customers. Another resident has picnic spots where guests can broil the fish they catch.

The Michigan trout ponds are proof that recreation farming can be very profitable under favorable circumstances. More significant, they show the advantages from putting land to its best conservation use. ♦

Book on Right-of-way Vegetation Planned

The Smithsonian Institution Office of Ecology is sponsoring the preparation of a book on "Right-of-way Vegetation Management," to be written by Dr. Frank E. Egler, Aton Forest, Norfolk, Conn.

The book is planned to provide how-to-do-it information for engineers and managers of vegetation-covered land along highways, railroads, power and telephone lines, pipelines, and the like.

Dr. Egler plans to include factual botanical specifications for right-of-way cover in the various vegetation regions of the continent.

He invites correspondence from people who would then be asked to prepare brief vegetation descriptions for actual localities to appear in the book over the names of the contributors.

Royalties from the book will go to a nonprofit organization. ♦

USDA's Resource Programs

Today, the USDA's broad resource programs are speeding conservation and wise use of soil, water, forests, grass, and wildlife through the National Forests and Grasslands and across the three-fourths of the land in private ownership.

The Alewives are running again . . . .

New England Generating Plant Gives Brook Back to Fish

By Robert N. Morehouse
Work Unit Conservationist, SCS, Hathorne, Mass.

THE Ipswich Power Company has its own industrial cooling pool, and the alewives have their own fish ladder and spawning pond after completion of a $20,000 project settled an argument between nature and industry over the use of the same water.

Ipswich, Mass., is a New England coastal town, famous for its clams, 17th century homes, and for picturesque ocean beauty. It is a rapidly expanding community only an hour's drive north from Boston.

The municipal electric generating station is near a State roadside rest area. Between these facilities flows Bull Brook which has been used for centuries by alewives in their journey upstream to spawn.

In the course of development, Ipswich constructed two public water-supply reservoirs and an industrial reservoir on the stream. This completely eliminated the alewives from the spawning areas.

Other problems were associated with the system. Water from the industrial pond was circulated for cooling purposes. As generating capacity increased, the water became too warm for cooling. Dense weed growth choked the pond, and eels were so numerous they clogged the water-intake screens. Weed and fish poisons used were washed downstream, ruining the trout fishery below. Oil from the engines seeped into the water. The concrete dam for the industrial pond began leaking. This matter became critical when a 2-year drought reduced runoff to a trickle.

Electric Department Manager Al Tobias sought a solution, believing that the cooling pond might be isolated and Bull Brook bypassed. He referred his problem to the Hathorne work unit of the Soil Conservation Service through the Essex Conservation District.

The SCS conservationists working closely with biologists of the Massachusetts Division of Fisheries and Game helped Manager Tobias develop a workable plan.

The cooling pond was isolated from the stream by diking its perimeter. This allowed treatment of the water for weed and eel control. A fish ladder and spawning pond bypassed the flow from Bull Brook. Sumps and good housekeeping in the power station eliminated oil seepage. The area was either graded and seeded to erosion-resistant grasses or riprapped with rock.

Other features include increased depth in the cooling pond, water-level controls, and a new series of spray evaporators for additional cooling capacity.

"The project has already proved itself a good investment," says Earl Dodge, foreman at the power station. "We have saved more than 150 hours of maintenance on the water-intake structures alone."

Local interest in the project is still enthusiastic. The Ipswich Conservation Commission, which initially supported the project, and the Ipswich Park Commission are planning to further beautify the area with flowering and wildlife shrub plantings. ♦

One of several fishing wiers (right foreground at left) in the Ipswich Power Co. cooling pond separated by a dike. The fish ladder (right) used by alewives to reach spawning pool was placed for exactly 7-inch overfall at each step.

Youth Corps Plants Trees on Slopes

WAMY puts the whammy on farm area problems

By J. P. Kuykendall
State Conservationist, SCS, Raleigh, N. C.

SOME 80 Neighborhood Youth Corps enrollees are planting hundreds of thousands of white pines and poplar trees on rugged, eroded, fallow land, or land otherwise unsuited for row-crop agriculture, in four economically depressed counties of western and northwestern North Carolina. They are also improving the productivity of existing woodlands by removing undesirable hardwoods.

The project is a part of WAMY, a program being carried out by local, State, and Federal groups and by individuals to help the people of the areas help themselves with problems of employment, education, health, and housing.

Community Action, Inc.

WAMY's official name is W. A. M. Y. Community Action, Inc. The name comes from the first letters of the four counties—Watauga, Avery, Mitchell, and Yancey.

WAMY's main goal is to improve the living standards of families in the area. The organization receives Federal funds from the Office of Economic Opportunity and the Labor Department's Neighborhood Youth Corps. Funds are provided by the North Carolina Fund. Other agencies, including the Soil Conservation Service and the Forestry Division of the North Carolina Department of Conservation, provide technical help and guidance.

The woodland project is being conducted by the Neighborhood Youth Corps. The four soil and

Discussing the tree planting project in the Mine Creek Community in Mitchell County are (from left) Kelly McNeil, the landowner; Ernest Eppley, WAMY director; and Robert Wilson, Mitchell County Conservation District board chairman.

NYC crew planting white pine seedlings on a steep slope on the the Lewis Brown farm in Watauga County. Second from left is Crew Foreman Dan Isaacs with the landowner (in light shirt).

The steep slopes of Jimmy Phillips' farm in Mitchell County were planted to white pines by the Neighborhood Youth Corps.

water conservation districts arrange for technical help from SCS and the Forestry Division through their memorandums of understanding with each agency.

Employment and education

The project provides income and training for boys of ages 16 through 21. It is also preventing erosion, improving the quality of woodlands, and providing a future source of revenue for many hard-pressed small farmers in the area.

Ernest Eppley, WAMY executive director, says it is one of their best projects. His enthusiasm over the success of the work is shared by James Rogers, Neighborhood Youth Corps deputy director for the area.

"The boys are really interested in the work—they are learning, making some needed money, and at the same time they're helping improve the farms of the area," said Rogers. "At first we had to almost shake the bushes to get them to sign up but now we're keeping the quotas full."

The "quotas" are 4 crews of 20 boys each—a crew for each of the

4 counties. The local conservation district supervisors choose the foreman for the crew in their respective districts. Three of the 4 foremen are former district supervisors. All know about woodland management and other soil and water conservation work.

The district supervisors, with the help of the local SCS conservationists, decide where the tree planting and woodland improvement work is most needed and schedule it as a part of the district cooperator's conservation plan. To assure good distribution of the work, not more than 20 acres of woodland is planted on one farm. The farmers buy the seedlings from the Forestry Division and pay for the chemicals used to kill unwanted or "weed" trees.

Conservation lessons

The boys ask a lot of questions about the trees and how to manage them, and other things about conservation. Besides learning how to plant the seedlings, they also learn about tree diseases, how to identify trees, and how to kill unwanted hardwoods.

Some of the boys have never had a regular job before, so they're learning basic work habits. They earn $1.25 an hour and can work 25 hours a week. They also get 6 hours a week in remedial education and counseling. Their education level is eighth grade or lower.

The boys are enrolled for 6 months. At the end of this period, they are rescreened, and if it is felt that they can benefit further from the program, they are allowed to continue for a longer period. Some of them have returned to school. Others have found jobs or entered military service.

Kenneth South, 17, of Tamarack in Watauga County had dropped out of Watauga High School in Boone. He worked with a tree planting crew in his county from April to August. He became so interested in the work and related activities that the Neighborhood Youth Corps sent him to Washington to attend the National Youth Conference.

Kenneth came home even more enthusiastic about the program, especially its beautification aspects. He returned to school in September. Later he prepared a 10-point proposal for improvement of conservation and beautification in the area.

NYC Deputy Director Rogers estimated that from January to May the boys planted about 640,000 trees on the farms of 117 landowners. In addition, they eliminated cull hardwoods from 509 acres of woodland on the farms of 46 landowners.

Robert Wilson of Bakersville, chairman of the Mitchell County Soil and Water Conservation district board, estimated that 266,000 trees were planted on about 255 acres in his district.

"Our goal for next year is 500,000," he said.

George King, Burnsville, of the Yancey County District board, said the tree planting program "highlighted" the activities of his district for the past year. He estimated that nearly 200,000 trees were planted on 275 acres during the year.

"Our woodland improvement work has surpassed anything we've done in past years," said King.

Where it started

Poplar Community in Mitchell County is perhaps typical of the communities where the trees are being planted. About 200 families live on small tracts of steep land. Most of the young people have gone away, seeking new opportunities. The older people remaining have cut the good timber for lumber or power poles as their main source of income.

For the most part, only cull or otherwise undesirable hardwoods remain. Some of the landowners are trying to plant small areas of burley tobacco, and a little corn. They raise a few cows and hogs. Much of the land is too steep for pasture grass, and erosion is taking its toll.

Wilson and the SCS conservationist assisting the Mitchell Conservation District, Ray Bryant, were among the leaders in getting the project started.

"We have been trying to get the folks in our district to stop trying to cultivate these steep slopes and plant them in trees for years," says Wilson. "The owners haven't been able to do the work or to hire it done—this Youth Corps project seems to be the answer to one of our big problems."

To borrow a term from a well known comic strip, they think the tree planting project of WAMY has made a good start in putting the "WHAMMY" on some of the area's real problems. ♦

Farm Recreation Is Good Business

IF the enthusiasm of campers is any indication, success is assured for William (Bill) Hellerstedt's "Camp on the Mississippi" near Elk River, Minn.

Bill Hellerstedt, a commercial airlines pilot, his wife, and their eight children moved onto 50 acres of a former truck farm about 3 years ago. Since they wanted their country home to contribute to family activities and income, the Hellerstedts decided that camping would be a good product to sell, and that the family would enjoy "producing" it.

In preparing for this venture they spent much time camping out, visiting, and studying commercial and public campgrounds.

Early in 1965 Mr. Hellerstedt also attended an all-day symposium of rural recreation conducted by the Minnesota Chapter of the Soil Conservation Society of America in Minneapolis where he heard a

farm couple tell of their experiences with campers and summer vacationers.

Public officials and technical advisers gave him a good review on legal and technical problems that might be encountered in developing income-producing rural recreation areas, and he studied "A Guide for the Construction of Tourist Camps" from the Minnesota Department of Health, which included tent and trailer camps.

As cooperators with the Sherburne Soil and Water Conservation District, the Hellerstedts had the help of the Soil Conservation Service in developing a plan that included recreation uses based on the capability of their soil and on good land use. Soil surveys and an air photo were used in making this plan. The Hellerstedt farm was the first in the Sherburne District where the owner planned to use his land to produce recreation for sale.

In addition to 18 acres devoted to recreation uses (tent and light trailer campgrounds, playgrounds, and a boat landing), the plan provides for 13 acres of cropland (garden and mostly hay for horses), 4 acres of field and farmstead windbreaks, 1½ acres of horse pasture, 3½ acres of Christmas trees (for "come out and cut your own" harvest), 4 acres of wildlife land suitable for nature study, and 5 acres for buildings and roads.

By mid-July of 1964, 32 tent campsites with fireplaces, water, picnic tables, sanitary facilities, and a parking space were ready, and the camp was opened, along with boats and canoes for fishing in the river.

The William Snyders of Anoka were among the first campers to arrive, and they liked it so well they returned many times during the season. They had a hard time tearing the children away when it came time to pack and go home.

The campers feel the Hellerstedts have a good camp. They picked an attractive site on high dry ground overlooking the Mississippi River. A blacktop road leads to nearby U. S. Highway 10 and the progressive village of Elk River. The Twin Cities are only 45 minutes away by car.

As business increases, and it promises to do so, the Hellerstedt's camp can be expanded. Prospects for the future look good.

"Camp on the Mississippi" illustrates a relatively new use of farmland for rural recreation, and this land use is a means of increasing farm income.—HENRY WILSON, *Soil Conservationist, SCS, St. Cloud, Minn.* ♦

District Promotes Christmas Trees

Joseph Trombley (foreground) watches a scotch pine being tied with plastic netting in machine that he built.

"THE DAYS of selling four or five trees in a bundle are gone," says Joseph Trombley, leader of a special project to promote the production of Christmas trees in the Lamoille County Soil and Water Conservation District, Vt. "Produce a good quality tree, individually tied, and you have no trouble selling your product."

To improve his own operation, Trombley has built a machine which ties a tree in about 1 minute. He has scotch pine and balsam fir stands on which he does both shearing and pruning work.

Arlo Sterner, county forester, is working hand-in-hand with the district supervisors and Soil Conservation Service people on the project.

A half million trees are now under management in the district. Many old native pastures which are not now being farmed are well suited for Christmas tree production.—GENE FELLOWS, *Work Unit Conservationist, SCS, Morrisville, Vt.* ♦

The finished product. Joe Trombley's son pulls a scotch pine through the netting machine.

Strips and Pond Beat Drought

A rotation of corn, small grain, and grass-alfalfa meadow in a contour stripcropping pattern is a favored conservation system.

STRIPCROPPING and stock-water ponds pay big dividends, especially during drought, says Clarence Johannes of Wyoming County, N. Y.

Johannes, a cooperator with the Wyoming County Soil and Water Conservation District since 1942, prepared a conservation plan for his original 100-acre farm. At that time he laid out 14 strips below a diversion ditch. He is still using the strips today.

Over the years, he has added to his farm to make a total of 171 acres. All cropland is stripcropped. He uses a 5-year rotation of corn, oats, and hay (3 years).

Johannes reports that his hay yield in the severe drought year of 1965 was 85 to 90 percent of normal; even new seedings yielded 45 to 50 percent normal. Yields for nonstripped fields of established alfalfa in the county were about 60 percent, and yields of new seedings as low as 20 percent.

Mr. Johannes says the strips made the difference in his yields.

He built two SCS-designed ponds. One in 1951 served his stock-water needs until the long dry spells came and the herd was enlarged. The second he built in 1964. He uses both ponds for stock water, piping one to the water cups in the barn. Both ponds are close enough to the buildings to be used for fire protection.—KERMIT KRUSE, *Work Unit Conservationist, SCS, Warsaw, N. Y.* ♦

Conservation Wins Award for Farmer

A SUPERVISOR of the Washington County Soil Conservation District, Tenn., David Garland, credits soil conservation farming for his winning the 1966 award as Outstanding Young Farmer in Tennessee.

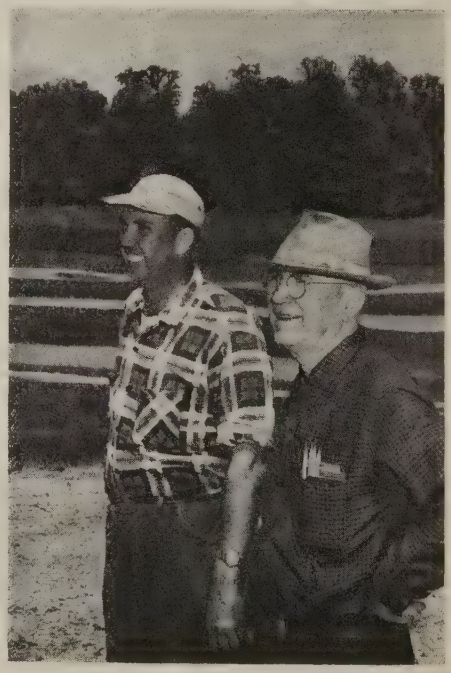
He and his wife, Jane, and their two children live on their 460-acre farm. To produce feed and forage for 175 Holsteins, Garland farms about 250 acres in alternate strips of row crops and grass meadow, using a 4-year rotation of 2 years row crop and 2 years grass meadow. He converted his natural draws to grass waterways and uses field borders of grass sod as turn rows for harvesting hay.

"I feel that using soil conservation measures on my farm and my work as a soil conservation district supervisor are largely responsible for my winning the award," Garland says.

In 1963, David Garland was named the Conservation Farmer of the Year in Washington County, and in 1964 was appointed a supervisor of the district by the State Soil Conservation Committee. He now serves as secretary of the board.

Garland planted about 25 acres of land, too steep for crops, hay, or pasture, to loblolly and shortleaf pine. He manages all his woodland for the highest yields of timber, using the assistance of the State Service Forester.—ADDIS S. HARVEY, *Work Unit Conservationist, SCS, Jonesboro, Tenn.* ♦

David Garland, 1966 Outstanding Young Farmer in Tennessee, and his father, J. G. Garland, discuss stripcropping on their farms.



Army Station Provides Conservation Experience

By Russell L. Roberts
Soil Conservationist, SCS, Point Reyes Station, Calif.

WILDLIFE, conservation, and outdoor recreation have become familiar experiences with personnel at the U. S. Army's Two Rock Ranch Station.

They are seeing the results of a conservation plan worked out under the direction of Commanding Officer Col. Robert Walker who signed an agreement making the base a cooperator with the Petaluma Soil Conservation District in 1965.

SCS conservationists helped determine appropriate erosion-control measures for the entire 830 acres. The plan includes wildlife-habitat improvements, a pond, recreation areas, and a center for Boy Scouts.

Two Rock Ranch Station also received assistance from the California Department of Fish and Game and the State Forestry Department.

This Army communications station is 50 miles north of San Francisco near Petaluma, Calif. The soil is typically light in texture and moderately erodible. Some of the steep cultivated land had numerous gullies when the Army acquired it.

The miscellaneous military buildings and family housing cover approximately 162 acres of the station. The remaining 668 acres is being leased on a yearly basis to a neighboring farmer. Since no livestock are allowed on the military reservation, the lessee cultivates the land for oats and vetch hay crops.

The conservation plan calls for retiring 169 acres of the steeper land from cultivation and seeding the area to a permanent grass cover. More than 20,000 feet of diversion terraces were constructed in the fall of 1965.

The Boy Scout Center on Two Rock Ranch Station includes a council ring and totem pole installed with volunteer help of residents on the base.

SCS technicians surveyed and staked out a dam on a site where a fill of 2,575 cubic yards would back up nearly 23 acre-feet of water. The reservoir is to be stocked with bass and bluegill.

Colonel Walker has added an extra attraction to the reservoir by having the contractor leave a ½-acre island in the middle. Trees were planted on the shores to provide shade for a picnic area. To add a bit of tropical flavor, a 20-foot palm tree was planted on the island, along with Monterey pines.

A grass mixture was seeded on the top and sides of the dam to prevent erosion. A 3-foot wide plastic strip was laid at water level on the upstream face to protect it from wave erosion.

Boy Scouts have helped by planting more than 20,000 trees—mostly Monterey pines—on sites throughout the station. About 500 Russian olive trees were planted for wildlife food.

Wildlife already is abundant in isolated brushy areas. There are several coveys of quail and about 30 deer; also, natural predators that help control the deer population. A cougar was recently observed in the area. Many ducks and doves can be seen, and it is planned to introduce pheasants.

A couple of acres have been set aside near a brushy ravine for a Boy Scout meeting place. With the help of the Scouts and volunteers living on the base, a quonset hut, benches, and other facilities were built there. This makes an excellent place for Boy Scouts to study nature and observe conservation in action. ♦

Aerial Photographs

Rural and urban planning for the best use of natural resources is increasingly important in this country. Airphotos are a valuable tool for planners; they can be used in many ways, such as in preparing land use maps, measuring the size of a lake or a field, inventorying recreation facilities, and other ways.

Brush Control Restores Range Productivity

RANCHERS with deep, fine sandy loam soils in west central Colorado have restored their native rangeland to its productive potential by controlling brush and growing more grass.

Controlling brush with herbicide in large areas having 12 to 20 inches average annual precipitation and remnant native grass plants has brought multiple benefits. Soil erosion is checked, food and cover are provided for wildlife, the natural beauty of wide open western space is preserved, and, in some areas, the volume of water flowing from springs has more than doubled.

On the Ruth Kell ranch in the Glade Park Soil Conservation District sagebrush was treated with herbicide in the spring of 1964. In 1965, in areas of best response, each acre produced more than 1,100 pounds of airdry material. About 95 percent of this was grass —or nearly 1,050 pounds—compared with less than 200 pounds of grass and 700 to 800 pounds of unusable new leaves and twigs produced on brush before treatment.

Bill Whatley, a DeBeque Soil Conservation District cooperator, sprayed several thousand acres of mountain loam range site with herbicide for sagebrush and serviceberry control over a 3-year period. His summer grazing was doubled, and calf weaning weights went up 50 pounds a head.

Where sufficient native grasses are not present, they are introduced by seeding. Some ranchers use a brush beater before seeding, others plow the sagebrush and prepare a seedbed.—FORREST MAHAFFEY AND LYNN HEALEY, *Range Conservationist, Grand Junction, and Work Unit Conservationist, SCS, Collbran, Colo.* ♦

Range dominated by big sagebrush (top) still supports a good scattering of grass plants to revegetate the area when brush is controlled (center). No grazing occurred the first and second year to allow for seed production and growth of seedling plants. Proper range management (bottom) protects grass from grazing until it is ready in the spring and uses pastures on a rotation system to allow forage plants to produce seed and retain vigor.

Ecological Studies and the Human Environment

By William R. Van Dersal
Deputy Administrator for Management, SCS

GROWING dissatisfaction with our habitat afflicts an increasing number of Americans. In recent years, many of us have awakened to the fact that our surroundings are getting smoggier, dirtier, uglier in many ways.

So many Americans are asking why we have to put up with this fouling of our habitat that Congress and the President have taken note. We now have a whole series of legislative acts and administrative policies designed to improve the places where we live and spend our leisure.

Wildlife biologists long have recognized as their principal task the improvement of habitat for specific animals and for "wildlife" in general. Now the biologist is becoming involved with nobler game. This time it is man himself. But we do not call it "habitat improvement;" we speak, instead, of "improving man's environment."

Ecology of landscape

Whether for man or wildlife, environmental improvement requires an appreciation and understanding of the whole landscape. The more knowledge we have of the relationships between land and water, between plants and animals, and among the multitude of species that make up the ecological community, the more likely we are to deal appropriately with our landscapes. Such ecological knowledge is essential if we are to maintain an environment of beauty and interest, of health and variety.

New insights into the complex relationships of our environment are provided by a remarkable new book, *The Pattern of Animal Communities,* by the distinguished British scholar, Charles S. Elton. Possibly more than any other work in print, this volume explains what may be going on in an "ordinary" landscape. It reports on a 25-year study "in depth," still continuing, of a 2-square-mile tract of woodland near Oxford University. The author's conclusions have very great practical application to the whole problem of environmental improvement for man himself in the present-day world.

In the course of the ecological survey, Elton and his students, and other workers, have identified with certainty some 3,800 species of animals (including insects) on this bit of English countryside. Elton believes that there are probably a good many more than 5,000 species present.

Visit with the author

When I visited with Charles Elton in 1957, we walked through a part of Wytham Woods, as he explained the survey he was making. There were thousands of species here, he told me, and the job of identification alone was gigantic. He and his coworkers were trying to find out what each one was doing there. For many, he had found a complex series of relationships between insects, parasites, hyperparasites, and predators. For others, nothing. "We simply don't know what they are doing here, if they are doing anything," he said.

He went on to sketch for me, in his unassuming way, the infinite variety of habitat and animal relations. I did not tell him, but his dissertation, his easy familiarity with the animals and plants we could see, and many we could not see, the astonishing number of species and myriad of individual animals involved, left my imagination tottering. As he describes it in his book:

" . . . there are something like a hundred kinds of habitat (. . . ignoring the individual habitat units provided by hundreds of separate species of plants) most of which are replicated inexactly thousands of times, though some only once or twice, and inhabited altogether by up to 5,000 species of animals, perhaps even more, and with populations running into very many millions . . . "

Add to this the fact that the Wytham area "must be under constant bombardment by floating small insects, many of which (such as aphids) may be really key species in the communities to which they belong." Studies showed several hundred species and thousands of individuals thus floating in during a season.

"What are we to do with a situation of this magnitude and complexity?" asks Elton.

Uneasy balance

He has been trying to understand—and he helps his readers to do so—" . . . the scale of communities; how, if at all, the different parts of the pattern have sepa-

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The Pattern of Animal Communities. By Charles S. Elton. *1966. Methuen and Co., Ltd., London; John Wiley and Sons, Inc., New York. 432 pp., illus.*

rate communities; how these can be defined and classified; how these separate aspects of the whole system are related and interact; what prevents the animals from completely destroying the vegetable and possibly other parts of the landscape, that is, what preserves the balance of numbers among them (uneasy balance though it may be)."

Elton has produced many new concepts of the structure of natural systems. He discusses the extraordinary power of ecological recuperation, as evidenced in the English countryside exploited for centuries.

"Nature resurgent after its exploitation by man," he notes, "can become an active dynamo of ecological process and interaction . . . "

In an earlier book, *The Ecology of Invasions by Animals and Plants,* (Methuen and Co., Ltd., London. 1958. 181 pp., 51 plates), Elton had pointed out that "We are living in a period of the world's history when the mingling of thousands of kinds of organisms from different parts of the world is setting up terrific dislocations in nature. We are seeing huge changes in the natural population balance of the world . . . We are seeing one of the great historical convulsions in the world's fauna and flora."

The studies reported in his latest work enable him to state that "simple communities, that is, communities with few species, are usually less able to withstand invasion by new animals or plants coming from without than are large and complex communities . . . If this proposition is true, the fact of complexity would seem to carry with it some stabilizing property."

"No habitat component with its animal community," he is able to state, "is a closed system." Every community is partly interlocked with others, not necessarily its nearest neighbors . . . " "This," he says, "is a universal and widespread property of ecosystems."

Danger of simplicity

According to Elton, "There are two dangers that are now being more widely discussed than formerly. The first is that in giving priority to economic productivity, especially in regard to the production of large cash crops from the land, the human environment itself may gradually become dull, unvaried, charmless, and treated like a factory rather than a place to live in. The second is that oversimplified communities contain within themselves flaws of organization that render them vulnerable to invaders of unfamiliar kinds, especially those that have evolved in other continental areas."

"Just how we are to maintain ecological arrangements that will help to solve this dilemma is not yet certainly known, but there are two things that should be done. One is to maintain the maximum variety of natural and seminatural habitats and their communities in the landscape as possible buffers against invasions and unbalance."

"The second thing we can do is to discover how life is organized and the balance maintained in natural deciduous woodland . . . For it is in woodland . . . that the highest diversity of habitat has been evolved on land, and relationships and population pressures exist in their most elaborate form."

In his closing words, Elton suggests that by learning to understand more about the actual ecosystem in nature, "and how the forces within it are controlled, we shall be better prepared to face conservation problems generally, and perhaps may begin to understand just what so often goes wrong in the artificially simplified croplands and planted forests that . . . form the major part of our surroundings . . . "

Actually, the application of Elton's findings can scarcely be enumerated, let alone described, in a review such as this. His ideas are set forth in three works of which the latest one is the most comprehensive and mature. Besides the two books already mentioned, his *Animal Ecology,* published in 1927, had a far-reaching influence on biological thinking. Each of his three books might well be considered a lifetime task for one man. The three together place Elton as one of the greatest living ecologists of our time.

Biologists, ecologists, foresters, range conservationists, geographers, soil conservationists, and others will find a study of Elton's ideas richly rewarding.

Possibly this British ecologist understands better than anyone else the almost fantastic complexity of the environment in which we humans live and work and play. He makes no extravagant claims. His painstaking researches and studies are summarized with careful phrasing.

One hopes only that his remarkable perception, and the depth and scope of his insight into the ecosystem of which man himself is a part, is not too far ahead of his time, and yet not too late to be of value in a world of change. ♦

Water Management

Irrigation water management is having the right amount of water in the right place, at the right time, to meet the needs of the crop without over- or underirrigating.

Case studies on western farms, made by the Soil Conservation Service, show savings to landowners of 20 to 60 percent per farm in irrigation water, $5 to $25 per acre in cost, and 3 to 12 hours per day in labor following proper irrigation practices. ♦

Farm-Industry Employment

Farming uses more than a billion acres of land and about 5.6 million workers. Industries that process and distribute farm products employ about 10 million. ♦

Getting Agriculture Moving: Essentials for Development and Modernization. By A. T. Mosher. *1966. Frederick A. Praeger, Washington, D. C. (for the Agricultural Development Council) 190 pp., illus. $6.50.*

"The purpose of this book is to state as clearly as possible the elements that go into making agriculture more productive, and to show how these elements affect each other and depend on each other . . . *Getting Agriculture Moving* presents an overall review of the bare minimum that every technician, fieldworker, administrator, planner, and legislator needs to know about the total process of agricultural development."

This is a book for everyone interested in agricultural development. It should be studied carefully by those directly concerned with foreign assistance programs, including the training of foreign nationals in this country.

Part I describes the elements of agriculture, the production process, the farmer, the farm, and the farm business.

Part II describes five facilities and services that must be available to farmers if agriculture is to develop: Markets for farm products, constantly changing technology, local availability of supplies and equipment, production incentives for farmers, and transportation. Each is essential. Without any one of them there can be no agricultural development.

Part III describes five accelerators of agricultural development: Education for development, production credit, group action by farmers, improving and expanding agricultural land, and national planning for agricultural development. The author states that the accelerators are important, but not indispensable.

Part IV summarizes what it takes to get agriculture moving. The author describes the five essentials as the spokes of a wheel. If any one is missing the wheel cannot turn. If all essentials are present then the accelerators act as grease or ball bearings that speed up the development process. Some special problems of agricultural development are discussed.

Enthusiasm and determination are the engine; skills and knowledge are the tools. The reader is left with a challenge as to what he, as a member of his society, can do to raise agricultural productivity.—J. B. Rogers, *Foreign Training Officer, SCS, Washington, D. C.*

Birds in Our Lives. Edited by Alfred Stefferud and Arnold L. Nelson. *1966. U. S. Dept. Int. 561 pp., illus. $9.00.*

Fifty-four articles by 61 authors, 80 wash drawings by Bob Hines, and many photographs combine in *Birds in Our Lives* to give the reader a comprehensive review of a subject of increasing interest in modern life.

This is the kind of book that might have resulted if the Department of Agriculture had undertaken to produce a Yearbook on the subject of "birds" as it has done with a succession of such subjects as soils, grass, and trees.

The result is not surprising, since the senior editor brought to the production of *Birds in Our Lives* the skills he had used so well for 20 years before his retirement as editor of the Yearbook of Agriculture.

The Department of the Interior's book differs from USDA Yearbooks, however, in being more elaborate, more lavishly illustrated and printed, and in drawing its authors from the entire scholarly community rather than mainly from its own staff.

Many of the articles are by the country's best-known writers on their particular topics; all are by top-ranking authorities.

The scope of the treatment is well-nigh all-inclusive: what birds are, how people use them, how they have affected our literature and arts; birds in sports and recreation, in science and husbandry, and in the balance of nature; problems of bird damages, control, and conservation.

The book probably contains little new information for the expert in any aspect of bird life. For the average reader, however, it will answer almost any question he might have about birds, and probably tell him more than he knew there was to know.—B.O.

Land and People in the Northern Plains Transition Area. By Howard W. Ottoson, Eleanor M. Birch, Philip A. Henderson, and A. N. Anderson. *1966. Univ. Nebr. Press, Lincoln. 362 pp., charts. $7.95.*

This book focuses on the physical and economic features of the transitional region between the intensive Cornbelt type of agriculture in the eastern part of the Great Plains and the more extensive wheat and ranching operations of the High Plains.

The book opens with a historical section providing an interesting chronology of the various events and emerging programs that took place in the Great Plains during its development. The numerous efforts of the Government to cope with the problems of the Great Plains, from early-day conservation practices to the present comprehensive Great Plains Conservation Program, are given due attention.

Part two deals with factors affecting development of regional economies and related economic considerations within the Northern Great Plains region. The basic data are drawn from selected counties in the four States of North and South Dakota, Nebraska, and Kansas.

Part three is an interesting discussion of feasible adjustments in the economy and institutions of the region and their anticipated effects on the future of the Northern Plains.

Those interested in the rural community and concerned with the economic development of the Great Plains will find this well-written book authoritative and useful.—WILLIAM L. VAUGHT, *Resource Development Division, SCS, Washington, D. C.*♦

Wildlife Habitat Improvement. BY JOSEPH J. SHOMON, BYRON L. ASHBAUGH, AND CON D. TOLMAN. *1966. National Audubon Society, New York. 96 pp., illus. $2.50.*

This is a collection of principles, practices, and general information pertaining to the improvement of the environment for wildlife. In field of application it ranges from apartment house window sills to western grasslands and in practices from bird feeders to proper grazing. Some attention is given to the habitat needs of mammals, but the major consideration is that of providing better food, cover, and water for birds.

This paper-bound, letter-sized booklet is a helpful guide to the many things that can be done to help wildlife. It wisely advises that, for most projects, one should consult locally experienced wildlife technicians for more specific information.—LAWRENCE V. COMPTON, *Head Biologist, SCS, Washington, D. C.*

New Publications

The Wolves of Isle Royal. BY L. DAVID MECH. *1966. U. S. Dept. Int., Fauna of the National Parks of the United States, Fauna Series 7. 210 pp., illus. $1.00.* The report of a detailed study of the predator-prey relationship of wolf and moose in an isolated environment clearly illustrates several ecological principles, as:

"Approximately 5,823,300 pounds of browse are required annually to support the moose herd that produces the 89,425 pounds of moose consumed by about 1,512 pounds of wolves."

"The wolves appear to have kept the moose herd within its food supply, culled out undesirable individuals, and stimulated reproduction. Wolves and moose probably will remain in dynamic equilibrium, although the moose herd may decline in the next decade because a large proportion of the browse is growing out of reach of the moose."

Outdoor Recreation Action. *1966. U. S. Dept. Int., Bureau of Outdoor Recreation. Report No. 1. 56 pp. $1.50 per year, single copy $0.45, from Superintendent of Documents.* This new periodical aims to report on "major Federal, State, local, and private actions affecting outdoor recreation, natural beauty, and related conservation matters." The first issue summarizes recent State and local public actions. The next will concentrate on private and Federal actions.

Shelterbelts for the Northern Great Plains. BY ERNEST J. GEORGE. *1966, rev. USDA Farmers' Bul. 2109. 14 pp., illus. $0.10.* A well-known Farmers' bulletin updated.

Soil Surveys

Fisher County, Texas. BY RALPH L. SCHWARTZ. *1966. 76 pp., illus.; maps 3.17 inches to the mile (1:20,000).* Fieldwork by Willis L. Delozier, Auline R. Goerdel, K. T. Lofton, and Wesley E. Beckham.

Ellis County, Oklahoma. BY EVERETT L. COLE, ARLIN J. CONRADI, AND CLIFFORD E. RHOADS. *1966. 81 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Caldwell County, Kentucky. BY MAURICE E. HUMPHREY, RAYMOND A. HAYS, AND PAUL M. LOVE. *1966. 104 pp., illus.; maps 4 inches to the mile (1:15,840).*

Love County, Oklahoma. BY ARMINE J. MAXWELL AND ROBERT REASONER. *1966. 94 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

St. Francis County, Arkansas. BY JAMES L. GRAY AND VERNON R. CATLETT. *1966. 81 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

AMERICA THE BEAUTIFUL COLOR LITHOGRAPHS

America The Beautiful—New York USDA, SOIL CONSERVATION SERVICE

CONSERVATION FARM MANAGED FOR UPLAND GAME, DUTCHESS COUNTY SOIL AND WATER CONSERVATION DISTRICT.

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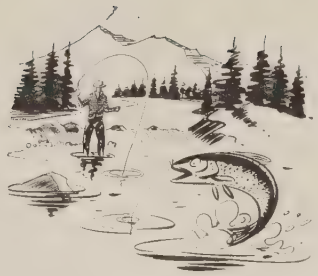
From the Administrator:

Environment for People and Wildlife



IN ALL its activities, the Soil Conservation Service gives consideration to wildlife values.

It helps land owners and operators consider and plan positive steps to increase wildlife as a product of the land where appropriate and as a part of the multiple use of soil and water resources.

In all activities, the Service seeks to avoid unnecessary damage to wildlife and to favor the increase of desired species as a corollary result of land use and soil and water conservation practices.

Wildlife is valued both for its economic worth and for its contribution to the esthetic and recreational appeal of the rural landscape.

The increase of wildlife abundance for either purpose is accomplished mainly by improving habitat on as much land area as possible. Since most land in the United States is in private ownership and used for such economic purposes as crop production, grazing, or woodland, it follows that the greatest opportunity for developing wildlife habitat lies in improving the features of agricultural land that make it useful to the various forms of animal life.

These same features make the rural landscape a more desirable environment for people also.

The interspersion of patches of shrubs and hedgerows with open fields, the alternation of woodlands and grasslands with croplands, and a liberal sprinkling of farm ponds add variety and beauty to the rural scene. Clear, clean water in streams, so essential to fish and other aquatic life, is equally important to the health and enjoyment of the human population.

SCS has a small staff of biologists to provide technical guidance to the wildlife aspects of its programs and to give needed training to field personnel.

Through its field organization, which makes technical services available through soil conservation districts, SCS is the principal agency in the Department of Agriculture dealing with wildlife conservation problems on private land. Such work is done in collaboration with other agencies of the Department of Agriculture, with State wildlife agencies, and with the Federal Fish and Wildlife Service.

SCS attention to wildlife is based on several considerations:

First and foremost is the fact that the agricultural lands of the United States produce the bulk of the game crop. This is the crop of squirrels, rabbits, quail, pheasants, doves, and other species commonly hunted on farms and ranches.

Second, and this is a fact often ignored, the production of fish and game is something that the private land owner or operator—the farmer, rancher, or other land user—can accept or reject. By his decisions, he can effectively aid or seriously hinder the increase and welfare of the animal life that uses the plants and water on his land. Insofar as hunting and fishing are concerned, the land owner determines whether it will or will not be permitted on his land.

Third, wildlife is a recreational resource of increasing importance. Greater efforts must be made to assure its continued availability.

Not only the familiar sports of hunting and fishing, but other outdoor pursuits that rely on continuing populations of wild birds, mammals, and other forms of animal life, are served by the attention that rural land owners give to habitat improvement.

The growing interest of urban people in outdoor recreation, including bird study, wildlife photography, hiking, and associated forms of nature observation, make nongame birds and mammals of increasing importance.

These are equally well accommodated by habitat improvements that farmers, ranchers, and other land owners can make on their properties.

And finally, fish and wildlife can be the source of additional income on many farms. Under certain conditions, fish and game species can be artificially propagated and sold. Shooting preserves and fishing ponds have proved profitable to many land owners. With less intensive management, natural populations of game can be built up until land owners can charge for hunting privileges and realize an income without selling the wildlife directly.

Experience clearly demonstrates that wildlife can thrive and reproduce in an agricultural setting. Constructive cooperation by farmers and ranchers, conservation organizations, and Government agencies can assure even greater abundance in America's wildlife heritage for the future.

The Soil Conservation Service considers the encouragement of practices that contribute to wildlife conservation on agricultural land to be one of its important responsibilities and seeks the cooperation of other agencies in these efforts.

The Service does not manage wildlife, but it does help farmers and ranchers manage their lands and waters to produce a wildlife crop.

And it is obvious that a rural landscape that is favorable habitat for wildlife is also a desirable environment for people.

D. A. WILLIAMS

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Water Conservation Saves Industry

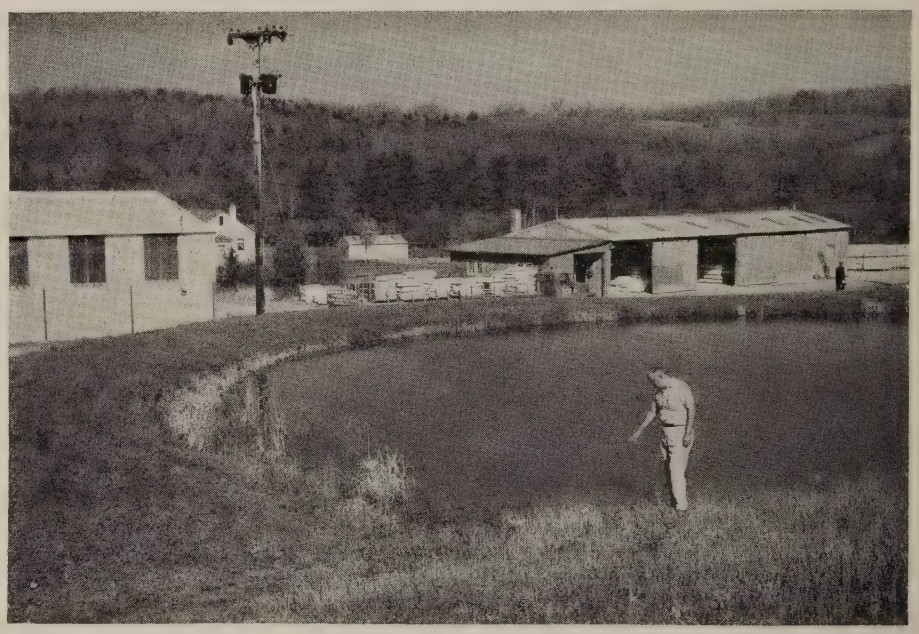
THE SEARCH for additional water to continue the stone cutting and polishing operations of Heldeberg Bluestone & Marble, Inc., led to a conservation plan for the surrounding land in upstate New York.

"Our equipment needs at least as much water as a hose will carry —that's 2 gallons a minute, 6 hours a day, or 720 gallons every working day," Paul Giebitz, Jr., vice president of the company, told the district headquarters at Delmar.

His industry handles Vermont marble and quarries local bluestone and fossil stone which is much in demand for building veneer, fireplaces, walls, and walks.

In 1958, only 3 years after setting up his cutting and polishing operation, Giebitz could see that he was running short of water. Carl Heidt, SCS conservationist serving the Albany County District, suggested a likely pond site up the slope a few hundred feet from the buildings, to supply water to the diamond saws and polishers.

A conservation plan was developed by Paul and his father. The pond was built, and more than 20,000 trees have been planted since then, on unused land and on the watershed above the pond. More trees will be planted on another part of the 240 acres.



Paul Giebitz, Sr., at one of the ponds supplying water to a building stone business operated by him and his son, Paul, Jr.

In the 1963 drought year, this growing business was again faced with the need for more water. In 1964, Giebitz and Heidt worked together to build two more ponds and a water-disposal system of ditches, tile, waterways, and diversions.

Storage and disposal of water is only a part of the success story of this business. There is another story here, one of rural community employment.

Giebitz and only 2 others worked in the bluestone business 10 years ago. Now, 14 people, living within a 10-mile radius, work in this East Berne industry. Four more live in Vermont and operate the marble quarry. Giebitz's local payroll is more than $75,000. There is no doubt that this rural area has benefited greatly by the impact of the prosperous growth of this stone operation.

Paul Giebitz explains his philosophy this way: "Since my products are taken from the ground, I feel a strong obligation to give back to the ground."—FRANK LEAVITT, *Work Unit Conservationist, SCS, Delmar, N. Y.*♦

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APRIL 1967
VOL. 32 NO. 9

Soil Conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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EXPANDING ROLE OF WATERSHED PROJECTS

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SOIL CONSERVATION SERVICE U. S. DEPARTMENT OF AGRICULTURE

Evolving . . .

The locally sponsored project, as evolved in small watersheds, is proving a practical way to get difficult conservation jobs done.

We see the extension of the idea in multicounty Resource Conservation and Development Projects. Local leaders who learn to see resource problems in their entirety, and who gain experience in small watershed projects, soon see the opportunities for community action on a larger scale.

Project Coordinator Rollin Swank in our lead article (p. 195) traces such a development in the Penn Soil Project.

Complete: At the same time, small watershed projects are evolving toward more complete action within their own boundaries.

Once damaging floods are brought under control, local people see many ways to improve their use of water (and land) resources, as in the Georgia example reported by State Conservationist Cecil Chapman (p. 202).

The same type of community action that can build floodwater-retarding structures can plan and build other facilities to increase water supplies, improve quality, or meet other local needs.

Critical Areas: Just such project action is what Administrator Williams sees (p. 215) as a cure for critical erosion areas—roadsides, streambanks, strip-mine spoil, and the like—now bypassed by individual action.

COVER: A multipurpose floodwater-retarding structure and land treatment on the Frye Creek-Stockton Wash watershed protects Thatcher, Ariz., from floods originating in the mountains in the background.

Soil Conservation

Devoted to the wise use of land and water resources

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SOIL CONSERVATION is the official organ of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. The printing of this publication was approved by the Bureau of the Budget July 25, 1963.

ORVILLE L. FREEMAN — Secretary of Agriculture
JOHN A. BAKER — Assistant Secretary of Agriculture
DONALD A. WILLIAMS — Administrator, Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service,
U. S. Department of Agriculture, Washington, D. C. 20250

BEN O. OSBORN, Editor
GEORGIE A. KELLER, Production Editor

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Watershed projects lead to broader goals

THE TREND toward multiple purpose objectives in watershed treatment demonstrates the feasibility of dealing effectively with all aspects of water management in projects under Public Law 566 and in the 11 authorized river basins.

Project plans most recently approved for operations show local sponsors becoming more and more aware of how water and related land resources can be grouped in a watershed community. The articles in this issue of SOIL CONSERVATION *give a fair sampling of the variety of purposes that can be blended into practical watershed-treatment programs.*

New public recreational facilities are currently being installed in 108 watershed projects in 33 States that will supply an estimated 7 million user-days of recreation a year. Plans for more than 130 watershed reservoirs include provision for municipal or industrial water-supply storage.

Irrigation, drainage, and fish and wildlife improvements have been part and parcel of intelligent watershed planning for some time.

Broad studies of our resource development needs—in river basins, for example—are now going on, and Public Law 566 projects are beginning to reflect their findings. In one project, planners are checking the feasibility of including measures for recharge of ground-water aquifiers. In another, recently approved for construction, water will be stored for later release as needed to augment streamflow to maintain water quality.

The outlook is for continuing attention to broader resource-development possibilities in America's "can-do" watershed program.

HOLLIS R. WILLIAMS
Deputy Administrator for Watersheds

Local Leaders Expand Aims In Penn Soil RC&D Area

By Rollin N. Swank
Project Coordinator, SCS, Mercer, Pa.

WATERSHED projects have formed a base for broader resource planning in the Penn Soil Resource Conservation and Development Project.

Six active projects under Public Law 566 gave an early boost to RC&D efforts in Crawford, Mercer, and Venango counties, Pa., by demonstrating the benefits of resource improvement and by developing community leadership. Many people who became active in the watershed projects are now the key leaders in the RC&D Project.

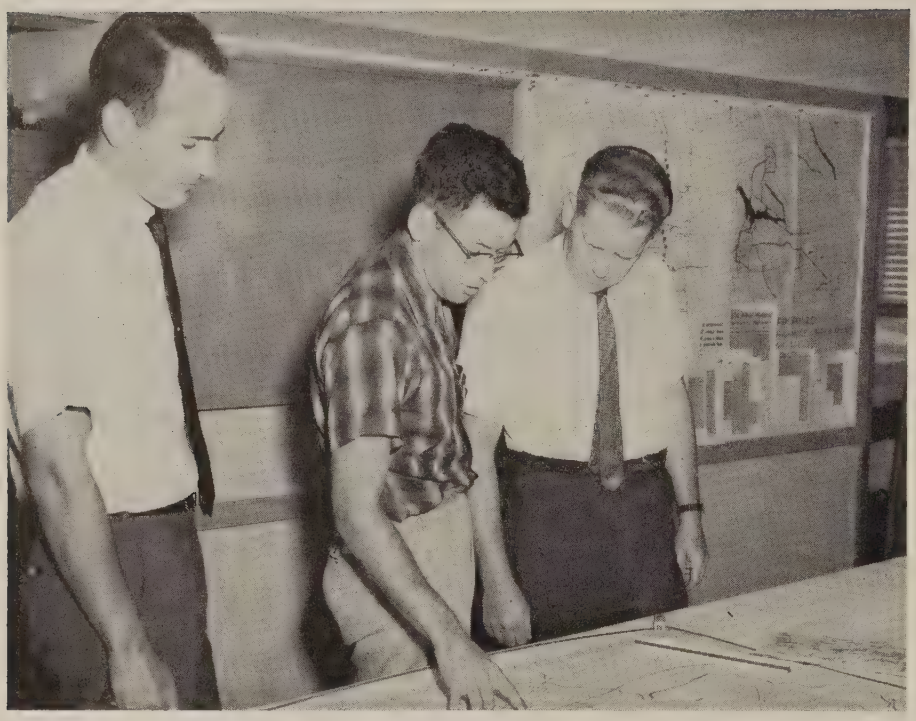
The watershed projects also helped to knit the three counties together. Severe floods of 1958 and 1959 proved that raging waters paid no attention to manmade county boundaries. As county commissioners and soil and water conservation district directors met to discuss and plan how to cope with the flooding problem, a strong bond developed among them. These local leaders became interested in and concerned with other common problems and opportunities, such as revegetation of strip-mine spoil, keeping farmers on the land, new recreational ventures, and other opportunities for resource development.

These broader challenges did not stop at natural watershed boundaries. It was apparent that if progress were to be made in developing all of the resources, the entire area would have to be considered.

Mill Run

A good example of watershed stimulus to the Penn Soil RC&D Project is the Mill Run Watershed Project in Crawford County. This project protects the community of Meadville, which suffered

Recreation is one of the resources being developed by the Penn Soil RC&D Project.



Members of the Planning Commission staff, Michael Willard (left) and Arlie Reagan, study a township plan with RC&D Project Coordinator Rollin Swank (right).

$170,000 worth of flood damages from Mill Run in 1956 alone.

The Mill Run Project contains needed land-treatment measures and two flood-prevention structures. A unique multiple-purpose reservoir, Tamarack Lake, is formed by dams across two streams through a large swamp. The 4-mile-long lake covering 580 acres provides excellent fishing waters for area sportsmen at minimum cost.

The Pennsylvania Fish Commission helped develop this recreational lake by securing the necessary land rights and maintaining the lake after its completion. Its success as a recreational area is attested to by the line of cars around the lake from early afternoon to late evening.

Oil Creek

The Penn Soil RC&D Project sponsors and committees working on the plan recognized that full resource development of the area would be the springboard for achieving economic growth. The Oil Creek Watershed Project above the city of Titusville is an example of how the project meets their objectives.

Seven structures provide flood protection for the business district of Titusville and industries along Oil Creek. Industrial growth resulting from the project is expected to bring jobs for 700 more people in the next 5 years.

The project also will protect the million-dollar Drake Well Museum and State Park, site of the drilling of the world's first oil well. More than 100,000 people a year are expected to visit the museum and nearby Pithole City, an oil boom town that flourished briefly into a community of 10,000 people around 1865.

Local sponsors have applied for a loan of $218,000 from the Farmers Home Administration to acquire the land rights for project development in this watershed. Total estimated cost of the watershed project is nearly $2 million, and average annual benefits $102,400.

Saul-Mathay

Two flood-prevention dams in the Saul-Mathay Watershed Project protect the east side of Greenville in Mercer County. These dams, plus 6 others planned in the Little Shenango River watershed have influenced 2 industries employing 1,200 people to remain in the community. Floods in July 1958 and again in January 1959 had caused several industries to consider relocation unless flood prevention was provided.

These industries now are expanding operations. The Hempfield Township supervisors are presently working on a township park to be built at the Saul site of the Saul-Mathay watershed.

Little Shenango River

In the Little Shenango River watershed, the Chicago Bridge and Iron Company and the Bessemer and Lake Erie Railroad, are helping pay for construction of structures to protect their industries from flood damage.

The Pennsylvania Game Commission is assisting in development of a 652-acre impoundment for waterfowl habitat just south of a 2,500-acre goose management area on Pymatuning Lake. The Biology Department of Thiel College plans to use the sediment pool of one structure for student experiments in wildlife habitat.

Sandy Creek

The Sandy Creek watershed work plan includes a floodwater-retarding structure above the borough of Stoneboro and a long-sought multiple-purpose dam that will store 1,750 acres of water for recreational use above the community of Sandy Lake. Construction of the dam will be started in 1967.

The land for this project is being acquired by the State agency under "Project 70," a Pennsylvania land-acquisition program.

With the promise of flood prevention on Sandy Creek, the community has taken on a new outlook. The Clinch-Tite Corporation, a local wood-using industry, has expanded its operations to employ

more than 50 people. Kemco Corporation, located on the Sandy Creek flood plain, has received a $30,000 loan to double its productive capacity and will soon employ 27 more people. There is an air of confidence among the local merchants.

Other RC&D measures

The Penn Soil RC&D sponsors have included in the plan the planting of trees, shrubs, grasses, and legumes to stabilize critical sediment-producing areas. RC&D funds are provided for buying needed planting materials. Under the leadership of the Mercer and Venango County soil and water conservation districts, this critical area planting started in the spring of 1966. The goal is to plant approximately 3,000 acres of strip-mined land in the area, to control erosion and reduce sedimentation.

In Venango County, Boy Scouts helped pay their way to summer camp by planting trees on Saturdays. In Mercer County, underprivileged boys planted trees and gained valuable experience as well as pay.

The landowners received cost-sharing aid from the Agricultural Conservation Program and more financial help from two private electric utility companies. SCS assisted with the planning, and the Pennsylvania Department of Forests and Waters aided in supervising the planting.

Another goal of the Penn Soil RC&D Project is acceleration of the land-treatment program in the three-county area. A great deal of conservation work has been completed, but much remains to be done. The installation of contour strips, diversion terraces, waterways, and wildlife areas is essential to the total development of the area's resources.

Last year, SCS helped 572 landowners develop conservation plans as cooperators with soil and water conservation districts. Conservation farming is still the best way to insure beautiful open space for this and future generations.

Numerous private developments are now getting underway in the RC&D area. Ed Chadderton, for example, has shifted his 572-acre farm from agriculture to income-producing recreation. He formed a corporation that has built an 18-hole golf course on the farm. A large impoundment site and two smaller dams will serve as hazards and provide irrigation water for the course. Plans include residential development of about 400 lots around the golf course. Approximately $1 million will be spent in the conversion.

Urbanization is bringing new opportunities and new problems to the RC&D Project area. There are eight interchanges on the interstate system being built in the three counties. SCS is furnishing soils interpretations to land owners and developers to be used for planning of building sites, sewage systems, and road layouts.

An accelerated soil survey of 157,000 acres of land undergoing urbanization in Venango and Mercer counties is being financed in part under Section 701 of the Housing and Home Finance Act to provide information for local people to use in planning developments. During the past year, SCS provided 53 developers and subdivisions with resource information on which to base their land use decisions.

Another outstanding RC&D Project measure is the Penn Soil Conservation Education Center at Rocky Basin, a beautiful hemlock gorge just off the interchange of Interstate Highway 79. The little community of Sandy Lake, population 873, raised $42,000 to purchase the 205-acre site after Turner Craig, president of the local bank and a member of the Education Committee of the RC&D Project, interested the sponsors in the proposal.

A conference auditorium, dormitories, libraries, and other facilities will make this a true conservation education center. The entire 1½-million-acre Penn Soil RC&D area will be used to demonstrate conservation at work and develop a conservation conscience in the community. The sponsors are working with a local college to put the center into operation.

The sponsors believe that the people of the area and the leadership they provide are their most important resource; that natural resources are important only as they affect the people. The RC&D Project provides opportunities to use the leadership and find new ways to make resources meet the needs of the people. ♦

The expanded operations of a pallet-making plant in Sandy Creek watershed will employ 50 additional people.

The town of Thatcher lies on a plain at the foot of the mountains.

Taming of Flash Floods Gives Desert Towns Chance to Grow

By James Ferrin
Work Unit Conservationist, SCS, Phoenix (formerly at Safford), Ariz.

HEAVY RAINS deluged the mountains, hills, and terraces above Safford, Ariz., in December 1965.

Afterwards, the mayor of Safford, Charles Kirtland, reported thankfully that his city and surrounding farmlands of Graham County had been spared more than $125,000 in damage from floods.

The mayor said the Stockton Wash dam and channel, completed in February of that year, held back a flood of more than 1,000 acre-feet of water, with no damage to the structure or the protected area below it.

Stockton Wash was the last segment of Frye Creek-Stockton Wash Small Watershed Project. Safford, neighboring Thatcher, Graham County, and Gila Valley Soil Conservation District were local sponsors of the project. Soil Conservation Service provided financial and technical assistance.

The Frye Creek-Stockton Wash Small Watershed Project was authorized by Congress in June 1959, after nearly 5 years of organization, planning, information-gathering, and other preparation. It involves 153,714 acres—58 percent Federal land and 42 percent private and State land and cost $3,609,000.

The local sponsors provided rights-of-way, administration, and $491,000 of the total cost. They operate and maintain the facilities.

Watershed planners estimate that benefits of the project will outweigh costs by 2 to 1.

The towns, the county, and rural

Before Frye Creek was tamed by a floodwater-retarding dam, runoff from summer storms spilled over into the streets of Thatcher, Ariz. At Safford, (right), Graveyard Wash is subject to flash floods from the mountains above the town.

A Little League baseball team sponsored by the Gila Valley Soil Conservation District takes part in a tournament on the new recreation area in the shadow of the Frye Creek floodwater-retarding dam.

landowners are enjoying a surge of flood-free economic activity.

Farmers are improving their facilities and operations with confidence that they won't be undone in the next storm.

Thirty new homes have been built on property now protected by the Frye Creek segment of the project and at least that many under the Graveyard Wash segment. A new motel, cafe, grocery store, service station, barber shop, and post office building have been constructed. A new motel, a new farm machine business, a new car dealership, and new office building have been constructed in the Safford area.

The annual cost of maintaining Graham County's road system has been greatly reduced, county officials report.

Eastern Arizona College has opened up a 35-acre addition to the south on what was formerly cotton land subject to almost annual flooding. New facilities worth $1.5 million have been constructed and more are in the building and planning stage: Gymnasium, athletic fields, and classrooms.

Two Little League ball parks built in the shadow of the Frye Creek structure are providing much-needed recreation facilities for the entire valley.

A new Graham County Mounted Sheriff's Posse rodeo arena, with seating on the face of the same dam, is providing another much-needed facility.

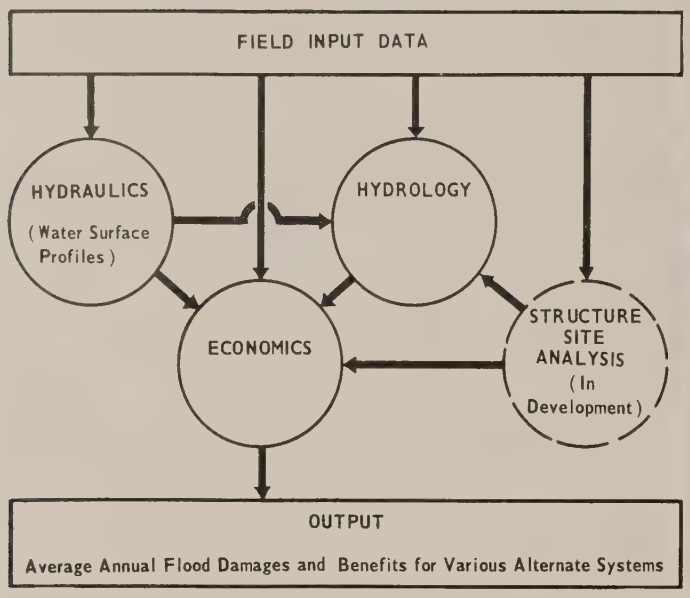
Support for the Frye Creek-Stockton Wash Project began to take shape after a bad storm in 1954. The late J. David Lee, chairman of the Gila Valley Soil Conservation District, proposed a project under the Watershed Protection and Flood Prevention Act.

Mayor Nat Hoopes and the city council of Thatcher; Mayor Osgood Rawson and his successor, Charles Kirtland, and the city council of Safford; Graham county supervisors headed by Vearl Lines; and the Gila Valley District board of supervisors got behind the idea and pressed it forward.

Now Graham County Manager H. C. Gietz says, "Each day we realize more and more the advantage of this project. The people of our community are continually relating to the board how happy they are with this project. The protection afforded by the flood-control dams and channels has saved many hundreds of dollars."

Says Eastern Arizona College President Dean A. Curtis:

"The flood-diversion dam made the expansion of the South Campus feasible. Prior to the completion of this project, the area of the South Campus (then a cottonfield) suffered almost annual damage as a result of flash floods coming down the large sand wash. Building the facilities of the South Campus has enabled the curriculum of the institution to grow with the increasing enrollment of the college." ♦



The chart shows the flow of data and relationships between the four project formulation programs for watershed planning. At right is a view of the electronic computer room in the Washington Data Processing Center of the Statistical Reporting Service.

Summary of Watershed Project Formulation Programs

Input data	Output options
Hydraulic (Water-Surface Profiles)	
(1) Cross-section coordinate data. (2) Channel length. (3) Flood-plain length. (4) Manning's "n" values. (5) Starting water-surface elevation. (6) Drainage areas.	(1) Elevation-discharge-area inundated data for 1–240 cross sections and 1–15 water-surface profiles. (2) A summary rating table of elevation, discharge, cross-sectional area, and area flooded. (3) Item (2) plotted as elevation-discharge curve. (4) Item (2) punched out on cards ready for use in both Hydrology and Economic programs.
Hydrology	
(1) Rainstorms—up to 9 actual or assumed distributions. (2) Water-surface elevation versus discharge rate and cross-sectional area for as many as 120 reaches. (3) Elevation versus spillway discharge rate and storage for as many as 60 floodwater-retarding structures. (4) Drainage area, watershed runoff factor, and watershed time-of-concentration for the subwatershed areas. (5) Length of each reach. (6) Elevation at which reservoir-flood routing begins. (7) Base flow amounts at each reach. (8) Proposed alternatives in the cross section of channels in (2) above. (9) Proposed alternatives in storage and other characteristics of each structure in (3) above. Also changes of structures being included or excluded. (10) Changes in watershed characteristics affecting rate or volume of runoff.	(1) Peak discharge and crest elevation for each routing through each reach. (2) Peak rate of outflow and maximum water-surface elevation for each routing through each structure. (3) Up to 300 coordinates of discharge and time for each routed hydrograph through each reach and through each structure. (4) Up to 300 water-surface elevation and outflow discharge coordinates for each routing through each structure. (5) Total routed storm volume past each reach and structure location for each routing. (6) Either or all of (1), (2), (3), (4), and (5) can be obtained for an unlimited number of combinations of input-data, items 1 through 10.
Economics	
(1) Crops being damaged. (2) Unit prices for crops being damaged. (3) Distribution of floods by seasons. (4) Floods to be evaluated. (5) Distribution and yields of crops in the evaluation reaches. (6) Percent damage factors for each crop. (7) Other-agricultural and nonagricultural damage factors. (8) Elevation-discharge-area inundated tables for each cross section. (9) Elevation at which flood damage begins at each cross section.	(1) Acres flooded and dollar damages by increments and by storms for all cross sections, reaches, and entire systems. (2) Item (1) distributed as crop and pasture, other-agricultural, and nonagricultural by increments. (3) Average annual damages and benefits for item (2) by cross section, by reach, and for system. (4) Item (1) plotted as discharge-damage-frequency curve.

SCS Electronic Computer Program Expanded to Include Economics

By R. E. Maclay
Head, Central Technical Unit, SCS, Hyattsville, Md.

THE ECONOMISTS in the Soil Conservation Service have joined the engineers in utilizing high speed electronic digital computers for watershed planning.

SCS has made operational the third of its "Project Formulation" programs—the latest one dealing with economics.

The Hydraulics (water-surface profiles) and Hydrology programs are already operational (*Soil Conservation,* July 1964). The fourth, "Structure Site Analysis," is still in the developmental stage.

The Economics Program is designed to use hydrologic data from flood routing as part of the input data. It can be used, therefore, to appraise floodwater damages after the relationships between depth, discharge, and area inundated have been determined in the Hydraulics and Hydrology programs.

Crop and pasture, other-agricultural, and nonagricultural damages are computed. Some types of damage not correlated directly with flood peaks are not determined by the computer program. For example, damage from land voiding through gully encroachment or bank caving and from deposition of sediment has not been included in the program. At this time the program does not measure benefits from irrigation, drainage, or other types of land enhancement.

The electronic computer programs were developed primarily to improve the quality, but also to reduce the costs, of watershed projects by making it possible to analyze a larger number of alternative systems of structural measures. The Economics Program can evaluate damages and benefits for up to 99 alternative systems for a watershed in one "pass" through the computer.

The economist and hydrologist jointly prepare the input data for the computer. The data sheets are in a format with headings familiar to watershed-planning technicians, rather than in a complicated machine code. The outputs from the computer also are in notations familiar to technicians.

The computer program can handle computations for as many as 120 "evaluation reaches" for a watershed. The economist normally makes a new evaluation reach for each significant change in crop distribution, crop yield, other-agricultural, or nonagricultural damage factors.

The engineer provides the economist with data on the areas inundated at various flood stages at selected cross sections within each reach. The program uses these data, together with the damage factors provided by the economist, to compute the amount by which each of alternative flood-prevention plans would reduce flood damages.

The output data consist of crop and pasture, other-agricultural, and nonagricultural monetary damages for each expected flood. The damages also are stated in terms of average annual values. The benefits are stated as the differences between damages caused by floods without the project and damages that would occur with each alternative structural system considered.

The computer program provides considerable flexibility in the amount of output information one chooses to receive. Visual charts of certain outputs are also available through the computer.

The Economics Program, as with others in the project formulation series, can be used independently or in conjunction with the others. Generally, the programs are used in sequence, so experienced technicians can examine the output from one program before it is used as input to another program. The programs are compatible, however, to the extent that certain outputs from the programs can be produced as punched cards suitable for direct use as input to other programs.

The Hydrology Program has been used to process data for about 150 watersheds a year. It is estimated that the Economics Program will make it possible to use both programs with 200 or more watersheds a year.

Because of the limited number of watersheds to be processed each year in any one State and the small amount of computer time needed for each watershed, most of the work is done at a central location for efficiency in contracting for computer services.

Input data are sent to the SCS Central Technical Unit in Hyattsville, Md. The actual processing is done through facilities at the Washington Data Processing Center of the Statistical Reporting Service in Washington, D. C. ♦

Watershed Lakes in Georgia Create Recreation Opportunity

By C. W. Chapman
State Conservationist, SCS, Athens, Ga.

WATERSHED projects in Georgia are providing many economic and recreational benefits beyond their basic intent of preventing floods.

In the 44 projects approved for operations under Public Law 566, local sponsoring groups are working together to protect and improve the more than 2½ million acres involved and to take advantage of new opportunities thus created.

One example is the 130,000-acre Tobesofkee Creek watershed in Bibb, Lamar, and Monroe counties. Here, after providing for flood prevention by land treatment on the watershed and two upstream floodwater-retarding structures, the sponsors added a 1,707-acre reservoir for water supply and recreation near Macon.

This special-purpose lake was designed to have a nearly constant water level and to maintain the normal streamflow, thereby avoiding the common disadvantages to recreational use resulting from the alternate filling and emptying of floodwater-storage reservoirs. The industrial water supply and recreation facilities will benefit more than half a million people in middle Georgia.

The project is sponsored by the Bibb County Board of Commissioners, the Ocmulgee and Towaliga soil and water conservation districts, and the Rural Roads Authority of the Georgia Highway Department.

The Soil Conservation Service is helping the local people plan the project and supervise its construction and has provided a grant of about 49 percent of the total cost of $4.2 million. The Farmers Home Administration provided loans to finance the local costs.

In 1962 Bibb County officials, realizing the need for more recreation facilities for a rapidly growing population and expanding industry, decided the Tobesofkee watershed dam and lake would help meet these needs. A survey made by the county showed that there was no equivalent facility within a radius of 50 miles.

The nearness of the lake to Macon made the project particularly attractive to the local people, including a large number of military and civilian personnel at nearby Warner Robins Air Force Base.

The lake, just about a mile and a half from a new junior college that will be opened in 1968, is expected to be a big recreational attraction to the students.

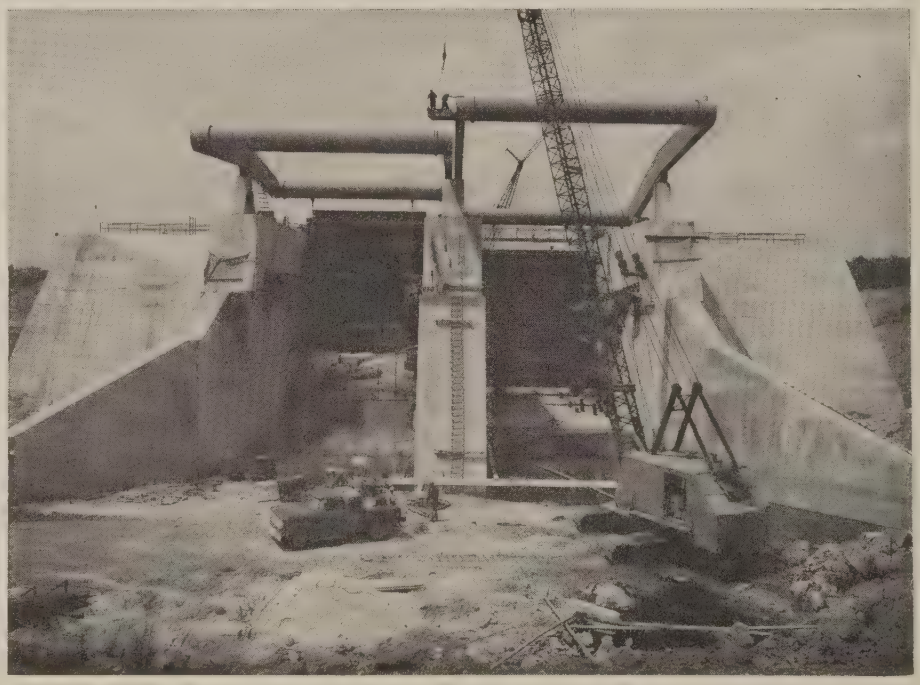
Bibb County is developing three parks around the lake and is planning three others. The six parks will cover 636 acres, and their development will cost more than $600,000. They will include boat ramps, outdoor cooking grills, picnic tables and shelters, camping sites, and access roads to recreation areas.

The Georgia Rural Roads Authority and the Federal Government are building four bridges and raising another one. One road will be relocated. Fishing, boating, and other concessions will be leased to private operators.

Kenneth Carswell, chairman of the Bibb County Board of Commissioners, predicts that the lake development will attract home builders and industries. He estimated that 1,000 homesites would be available around the attractive lake when it is completed.

The lake will be 6 miles long and will have a 34.2-mile shoreline. It will have a storage capacity of 25,000 acre-feet or more than 8 billion gallons of water.

The twin automatic gates have openings 40 by 40 feet in size. Note the two men, suspended by the crane, putting finishing touches to one of the counterweights.



Many engineers, contractors, and others have visited the project to see the dam's unusual design and construction. It is said to be the only one of its kind east of the Mississippi and one of only a few in the world.

Built into the 49-foot high concrete dam are twin counterweighted gates that will automatically maintain the water in the lake at a constant level.

Counter weight floats built into wells at either side of the dam, raise or lower the gates as the water level in the lake fluctuates. The gates are so well balanced that they can also be operated manually if necessary.

A pipe 30 inches in diameter releases water from the top of the lake to maintain normal flow of the creek without using the gates and to avoid releasing very cold water from the bottom of the lake that might alter fish habitat downstream. Another 30-inch pipe can draw down 2 feet of water for industrial use in Bibb County.

The Bibb County government paid the entire cost of this pipe and for enlarging the dam to hold the additional 3,500 acre-feet of industrial water.

Some 24,733 cubic yards of concrete was used to build the dam. Because it was being built in the summer, 300 pounds of crushed ice per cubic yard of concrete was used to keep the temperature of the mixture at 55 degrees or below. Some 3,750,000 pounds of ice, bought locally, was used.

The overall length of the dam, including 115,000 cubic yards of earthfill, is 850 feet. The embankments will be grassed. Rock riprap was placed on the face of the embankments.

The Bibb County commissioners have asked the State Game and Fish Commission to stock the lake with bass and bream and to manage it for fishing. About 1,750,000 bream and 175,000 bass will be put into the lake as it fills. ♦

City Soil Survey Started

The Haverhill Conservation Commission gets a firsthand look at soil surveying from Robert N. Morehouse, work unit conservationist, SCS (on left) and Everett Francis, soil scientist, SCS, (center), at ground-breaking for Essex District's first city soil survey. Members of the commission are (from left), Jason Cohen; Godfrey Flagg; John Curtin; Richard Fletcher, chairman; and Norman Bailey.

THE Haverhill Conservation Commission, Mass., picked up some practical knowledge on soil surveying at a ground breaking for the city's operational soil survey.

Everette Francis, SCS soil scientist, assisting the Essex Conservation District, showed the commissioners various kinds of soil and explained their suitability for certain uses.

Francis pointed out an area that had severe limitations for septic tank effluent disposal because of a hardpan near the surface and a seasonally high water table.

One commissioner remarked, "Now I know why some homeowners have a lot of trouble with their septic tank systems."

Richard Fletcher, commission chairman, said he feels that better land use will be emphasized by the survey as it will reveal potential problem areas.

"Knowing where they are, we can avoid the problems and save the city money and headaches," Fletcher said.

The conservation commission plans to distribute copies of the soil survey report and interpretive maps to every city agency in Haverhill, the first community in the Essex District to undertake a survey.—ROBERT N. MOREHOUSE, *Work Unit Conservationist, SCS, Hathorne, Mass.* ♦

Farmland Converted to Recreation

J. W. Goode, a cooperator of the Lee Soil and Water Conservation District near Ft. Myer, Fla., has found it profitable to convert his pasture and woodland to recreational use.

In 1966, some 3,000 to 4,000 trailer buffs with their portable homes descended on Goode's Garden of Light for their mid-winter rally.

Mr. Goode has a soil and water conservation plan developed with the assistance of SCS, and his facilities include camper and trailer accommodations, nature trails, boardwalk, modern restrooms, hot showers, and lounge. ♦

Stubble Mulching Against the Wind

By Walter N. Parmeter
Conservation Agronomist, SCS, Huron, S. Dak.

FARMERS and ranchers in South Dakota have learned by firsthand experience that any loss of topsoil or moisture by wind erosion is serious business. That is why they have turned with enthusiasm to stubble-mulch farming and field stripcropping for controlling wind erosion.

During recent years, wind erosion has annually damaged topsoil on as many as 175,000 acres in South Dakota. It has caused additional losses by cutting off or covering up young plants of winter wheat, barley, and other crops.

Stubble-mulch farming means managing plant residues on a year-round basis. Seedbed preparation, planting, cultivating, and harvesting are done in such a way that plant residues remain on the surface and protect the soil from wind and water erosion until a new crop provides protection.

Demonstrations of stubble-mulch machinery staged by the Soil Conservation Service and Extension Service in the fifties showed the types of blades, deep furrow drills, and other equipment available for good stubble-mulch farming. Farmers who saw how the use of this machinery helped to control wind erosion and conserve moisture saw a new future in farming.

This type of deep-furrow press drill, used by the Asmussens, has 5-inch shovels alternating in two rows across the drill. The front row is 28 inches ahead of the back row, allowing the residue to pass between the shovels readily.

After 7 years of stubble-mulch farming, William J. Asmussen, a cooperator in the Sully County Soil and Water Conservation District, says, "Regardless of whether your ranch is large or small, when the seedbed starts blowing away, it's a loss you can't afford to take. It can be rapid or slow, but it is always permanent and can never be returned. I think it's high time for all farmers with wind-erosion problems to start a stubble-mulching program."

Asmussen and his four sons—Stanley, Bill Jr., Kenneth, and Irving—operate 41,120 acres of farmland of medium-textured soil that is subject to blowing when left bare. Since seeing the stubble-mulch demonstration in 1959, they have used the practice along with field strip-cropping, to protect their cropland.

The Asmussens and other con-

In the fall Asmussen Brothers' tractors (far left) sweep over the fields, each pulling two 6-foot blades that kill weeds and loosen the soil without covering the stubble. At harvest time, self-propelled combines reap the reward of stable soil and conserved moisture. Wind strip-cropping (below) on the Dave Cash farm alternates drilled milo and wheat with summer fallowed strips.

servation farmers use deep-furrow press drills to plant their wheat. The 14-inch spacing with the 4- or 5-inch shovels leaves the field with prominent ridges and with residue on the surface, giving protection against wind erosion until the wheat is tall enough to protect the soil from blowing.

These drills have the shovels in two rows, one 28 inches ahead of the other. The shovels are spaced alternately in the two rows, making 28 inches between shovels in either row. The heavy residues on the seedbed pass readily between the shovels without plugging the drill.

Blade-type plows are popular with stubble-mulch farmers. The Asmussens use two 6-foot blades on each tractor. The blades cut through the soil 3 to 4 inches under the surface, killing the weeds and leaving stubble and residues on the surface. Each plowing is performed in a different direction across the field.

Stubble mulching uses Nature's principle of keeping the soil covered with plants or plant residues. Surface residues intercept and disperse most of the erosive force of wind and of raindrops and permit water movement into the soil. ♦

The combination of ridges and residue on the surface after drilling of wheat protects the field from wind erosion. In the picture are (left to right), Robert Koerner, SCS work unit conservationist, William J. Asmussen, and Stanley Asmussen.

Ranching, Recreation Good Combination

Jean Taylor, son Raymond, and daughter Becky on irrigated pasture on the ranch. Ponderosa pines and San Juan mountains rim valley.

DISTRICT Cooperator John Taylor, Pagosa Springs, Colo., diversified his ranch operation to step up his income by adding the Ponderosa Trailer Park to his ranching enterprise.

Fluctuating cattle prices along with the size of his unit—400 acres mostly in irrigated pasture—combined to limit his net profits.

One day John Taylor after watching thousands of vacationers travel past his ranch to go to the 325-acre Williams Creek Lake, created by the Colorado Department of Game, Fish and Parks, asked his wife Jean, "Why not provide facilities for these people to park trailers or pitch tents?"

Planning for the trailer park got underway in 1960. An architect and an engineering firm in their investigation conducted soil percolation tests, and they showed that the leach field Taylor wanted for the sewage system would not work. A septic tank and a lagoon system were installed instead.

Ponderosa Trailer Park went into operation in 1962. It has 15 spaces, equipped with water, sewage, and electrical hookups. A service building provides restrooms, showers, and a coin-operated, automatic washing machine. Shower facilities are free to park customers. Others may shower for $0.50 each.

As a cooperator of the San Juan Soil Conservation District, John Taylor will receive assistance from SCS in designing a pond. A trial planting of native grasses and flowers will be made by SCS. —ROBERT W. DELZELL, *formerly Work Unit Conservationist, SCS, Pagosa Springs, Colo.* ♦

The concrete inlet and chute spillway of Lou Yaeger Lake is 103 feet wide and 357 feet long. Last spring it handled a 3.9-inch rain with ease.

Multipurpose Lake Ends a Long Water Shortage

THE 100-YEAR water crisis of Litchfield, Ill., is over, thanks to the Shoal Creek Watershed Project.

A new 1,412-acre multipurpose lake built under the Watershed Protection and Flood Prevention Act stores 14,000 acre-feet of water. That is 4,573 million gallons or enough to fill 9,000 city water towers holding one-half million gallons each.

Room for growth

The reservoir provides a municipal water supply estimated to satisfy the needs for a city population of 150,000—plenty of room for growth for the present city of 7,800.

Other major benefits of the Shoal Creek Project include annual savings of $140,000 through prevention of flood damages, and a public beach with swimming facilities for 3,300 persons, plus an attractive environment for new industries. It is a prime example of farm and city residents working together to fulfill needs for upland conservation treatment, municipal water supply, drainage, recreation, and flood control.

Litchfield moved quickly to make use of the Watershed Protection Act of 1954. Mayor Lewis Yaeger saw the opportunity to remedy the water shortage and gained citizen support for the project. The resulting 1,412-acre reservoir is named Lou Yaeger Lake.

A real bargain

"Our new city reservoir was a real bargain," Mayor Yaeger says. "It meant a $2 million improvement in our water supply, at a cost of only $0.75 a month for each residential user." Previously, residents paid $1.25 a month for the first 2,000 gallons. Now, the rate is $2, still one of the lowest city water rates in Illinois.

Registering enthusiasm for the project, Mayor Yaeger said, "We are positive this development will bring in new industries and we also expect to see economic gain for Litchfield for recreation."

Litchfield is developing a 600-acre city park around the lake. A public beach is the big feature. Water in the beach area is chlorinated. Several boat launching marinas will also be installed, and camping facilities and riding trails will be provided. About half of the cost will be paid with Federal funds under the Watershed Act. The rest will come from State and local sources.

Litchfield is also developing subdivisions on lake front property. So far, 3 subdivisions have been laid out with 34 lots in each. To date, 23 lots have been leased for a total of $65,000.

The larger project

Of course, the story of Litchfield and Lake Lou Yaeger is only part of the total Shoal Creek Project. The main purposes for the watershed project are flood and erosion control.

Annual estimated flood damages on 7,500 acres of agricultural land in the watershed lowlands were $134,419. This does not include damage to roads, bridges, and other public property. When the project is completed, flood damages will be reduced by 80 percent.

The project plan calls for three floodwater-retarding dams, two multipurpose structures for municipal water and floodwater control,

Lou Yaeger Lake gives Litchfield an abundant water supply, recreation facilities, flood protection, and a tool for enticing new industries into the area.

and 24 miles of channel improvement. So far, Litchfield's multipurpose structure and one flood-water-retarding dam have been completed. Part of the channel improvement is about to get underway.

The watershed project has accelerated conservation treatment on the uplands to control erosion, sedimentation, and runoff. With the help of increased Agricultural Conservation Program cost-sharing, more than 50 percent of the needed land treatment has now been applied. The original goal for minimum tillage has been surpassed, and farm pond construction has reached 90 percent of the estimated need.

The total estimated cost of the Shoal Creek Project is $7,128,856. Almost $3.5 million will come from watershed funds, and $3.6 million from loans and State and local money. Benefits from the project have been calculated to be $1.60 return for every dollar spent. ♦

The proportion of U.S. farmers working off the farm today is four times greater than it was in 1934. Most of them hold down full-time industrial jobs and farm in their spare time. ♦

Wind Erosion Halted at Australian Airbase

Australia, too, is finding soil and water conservation principles as helpful outside agriculture as they are on the farm.

An article in the *Journal* of the Soil Conservation Service of New South Wales, April 1966 issue, relates experiences at the Williamtown R.A.A.F. Base.

Main problems at the military airfield were caused by wind erosion of the sandy soils. Sand drifted over runways, roads, and drainage systems and hampered construction during expansion of facilities at the base. Incoming aircraft often could not distinguish the runway because of blowing sand.

Measures carried out with help of the New South Wales SCS included land grading, topsoiling, grass seeding, fertilization, and an irrigation system.

For a cost of about 8 cents a square yard, the Williamtown Base solved its erosion problems. As author B. C. Fleck put it, "the costs for soil conservation treatment were infinitesimal when compared to the value of the works protected." ♦

30 Patches of Vegetation

SAVING the best of Nature's past mantle of vegetation is a measure of conservation practiced by Mr. and Mrs. Harvey Pofcher and their youngsters, Amy and Eric.

About 40 acres of meadows and woods surround their post and beam house on Ames Hill, near Brattleboro, Vt.

Quite unusual is the lawn around the house. It measures 75 by 150 feet. Interesting features are 30 patches of goldenrod, black-eyed-Susans, sourgrass, hardhack, native ferns, yarrow, Queen Anne's lace, wild white clover, and bluegrass. These were salvaged from original vegetation.

The house was built on native pastureland. When the lawn was seeded, according to Mr. Pofcher, "I was kidding around one day and happened to leave these spots."

Lime and fertilizer are used sparingly on the seeded lawn to prevent its competing with the 3- by 3-foot islands of wildflowers and native grasses. No treatments are applied to the latter.

The Pofchers are pleased with their own way of keeping America beautiful.—ROBERT H. BRIGHAM, *Soil Conservationist, SCS, Brattleboro, Vt.* ♦

Amy Pofcher looks at some of the wild flowers, ferns, and native grasses on lawn.

With just a bit of showmanship . . .

Museum and Snack Bar Attract Customers, Help Sell Products

By Edward G. Konieczny
Work Unit Conservationist, SCS, Greenfield, Mass.

TAKE A FARM in an attractive setting. Add a sugar bush, Christmas trees, and blueberries. Mix with a bit of showmanship, and what do you have? A profitable farm business.

That's the way it has worked out for Linwood B. Lesure. His 700-acre farm, high in the rolling country at Ashfield, Mass., has more than 500 acres of woodland.

In an average year Lesure makes about 2,000 gallons of maple sirup and markets a variety of maple products.

From 50 acres he sells Christmas trees and boughs for making home decorations. He adds to the farm income by selling hay from 125 acres. "Pick them yourself" blueberries are the newest enterprise.

As a cooperator with the Franklin Conservation District and a certified tree farmer, Lesure takes good care of his 500-odd acres of woods. He thins the stands periodically. The trees that are removed are used for poles around the farm or for fuel in his home. He culls his woodland stands in winter. In May and October he shears the Christmas trees to give them the traditional holiday shape.

But Lesure's main interest is in maple sugar. That's where his showmanship comes in.

He has made his sugar house big enough to include a snack bar. There you can enjoy piping hot waffles dripping in pure maple sirup, just a few steps from where it is made. In this room, too, you can buy maple sirup in colorful tins of various sizes. Also on sale are maple cream, spread, and candy in different shapes. All are packed in eye-appealing packages of attractive design and a variety of sizes.

The candies, creams, and spreads are made by Mrs. Lesure in her tidy and efficiently arranged kitchen. She makes half a ton a year. Pretty and gracious girls from the neighborhood and nearby schools serve the customers.

Mr. Lesure has enclosed the side of his evaporating room with glass, so you can watch the operation that turns the sap into sirup.

That isn't all. Lesure has a display of tools, devices, and equipment that have been used in the maple sirup business from earliest days. His exhibit, worthy of a museum, attracts thousands of visitors a year.

It didn't take Lesure long to observe that many visitors like to photograph the picturesque maple sirup business. So he put out props, such as an old-fashioned pail hanging from a tree, sap slowly dripping into it. The props, linking the romantic past with the present, are close to the sugar house for the visitors' convenience.

"I've noticed a great increase in the number of people who come out with cameras," Lesure said.

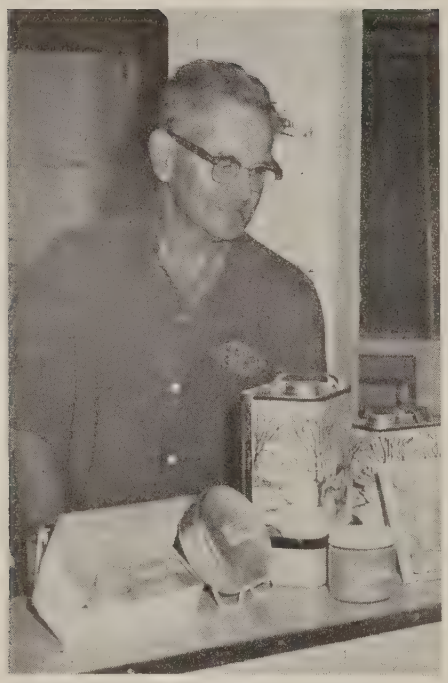
Painters, too, mostly amateurs but occasionally a professional, visit the Lesure farm to put the attractive setting on canvas.

Because they can see the present manufacturing process and, from the exhibits, reconstruct the progress of sap gathering and of "sugaring" through the centuries, students from nearby schools add to their knowledge at the Lesure farm. Smith College students come in busloads to study the maple sirup business.

Linwood Lesure has one other sales asset. An interesting talker, he can hold your attention by his knowledge of the business, past and present. He likes people and enjoys explaining the sugaring business to anyone truly interested.

He belongs to the Berkshire Pioneer Maple Producers' Association and other trade groups that put out attractive sales literature.

Customers gather around the sales counter at the Lesure Farm Sugarhouse.



Linwood B. Lesure displays some of the products of his sugar business.

To stimulate business further he circulates recipes made up by Mrs. Lesure, on order blanks, price lists, and location maps.

This promotion and showmanship helps business. Thousands of people come to the Lesure farm with the sole intention of seeing maple sirup made, viewing the exhibits, taking photographs, or painting the sugar house. Few, however, leave without buying something. Once they have sampled the products, they are likely to become permanent customers. Lesure has many repeat patrons.

Like the maple products, Lesure retails his Christms trees at the farm. Families come out early in the fall and pick the trees they want. He gives each a gaily-colored tag. The patron fastens part of the tag to the tree of his choice and keeps the stub, with a matching number on it. When the family returns to claim its choice, the tree is located by matching the stub with the rest of the tag. Lesure or his son Robert cuts the tree.

Robert, a full partner in the enterprise, is the fifth generation to farm the place. ♦

Farmer Now Has Running Water

FOR the first time in their lives, the Jule McGills of Heidelberg, Miss., and their neighbors have running water for household and farm use.

In 1965, Jule McGill, a Negro farmer and cooperator of the Clarke County Soil Conservation District, secured an Economic Opportunity Loan through Farmers Home Administration and developed a spring that supplies his own needs and those of five neighbors.

He improved his pasture, bought a registered herd bull, and in 1966 with Agricultural Conservation Program cost-sharing assistance, he converted 16 acres on his 160-acre farm to bahiagrass.

There are few pond sites in the Beaverdam Community where the McGills live. Mr. McGill never had running water and never enough cash to install a water system. Wells are scarce throughout the area and are extra deep and expensive to install.

Many of McGill's neighbors, like himself, had been getting their water for household uses from open springs or branches, where the water is exposed to cattle, other animals, and insects.

About 700 feet below the McGill farmhouse, a seep offered a possibility. With engineering help from the Soil Conservation Service, Jule McGill and his neighbors built a water system at a cost of $260 for the use of the five farm families and their livestock. Rural Electrification Administration erected extra poles, wire, and a meter at the spring to provide adequate current for the pump.

As a result of this work four or five other families in the same community developed springs, and added the convenience of running water to their rural homes.—H. C. WILLIAMS, *Work Unit Conservationist, SCS, Quitman, Miss.* ♦

Schott (left) and Washington SCS Range Specialist Claude Dillon discuss conservation ranch plan. Note bunchgrass in left foreground.

Rotation Plan Improves Range

"KILLING sagebrush and then overgrazing the grass won't improve range," says Wilbert Schott, rancher and soil conservation district cooperator living near Odessa, Wash. "That's why I rest a different pasture each year between April 1 and June 30. This lets the grass store food and make seed."

Schott explains that pasture rested 1 year will be grazed first the next year, or from April to May 15. Then he moves his cattle out for 6 weeks and brings them back again after June 30.

Sagebrush is sprayed in the pasture being rested in spring. This allows the existing bunchgrass to make maximum use of the spring moisture released to it and encourages a faster recovery of the grass.

Five gallons of a herbicide mixture is aerially applied to each acre sprayed, at a cost of $4.75 an acre. The Agricultural Con-

servation Program pays 50 percent of the cost. Schott figures the sagebrush kill should be good for at least 20 years. "It pays," the rancher adds. "My sprayed and deferred range went from fair to excellent condition after a couple of years of proper use."—HANS A. KRAUSS, *Work Unit Conservationist, SCS, Odessa, Wash.* ♦

Farmer Retires From Row Crops to Trees

Would you plant trees on land worth $1,000 an acre?

Anthony J. Urkiel of South Deerfield, Mass., a cooperator with the Franklin Conservation District, is doing it.

Urkiel has an 8-acre field of fine sandy loam in the Connecticut River Valley. At different times he has produced onions, potatoes, and tobacco for 40 years.

In due time Urkiel will have the pleasure of thinning his woodland. He will sell some of the trees at Christmas time to adorn the hearths of many homes.

"I've retired from row crop farming," he said. "I could sell the land, but I like to see things grow and feel that I have had something to do with the growth."—EDWARD G. KONIECZNY, *Work Unit Conservationist, SCS, Greenfield, Mass.* ♦

Solving Pollution Problem

The Sarpy Soil and Water Conservation District of Nebraska entered into an agreement with the Sarpy County Board of Commissioners to help solve a pollution problem stemming from the dumping of solid wastes into natural watercourses.

The objectives of the $90,600 Demonstration Grant awarded to the board of commissioners are to show a new method of using an eroded gully area as a sanitary landfill. Plans call for constructing an earthfill drop-inlet dam across the gully below the waste-disposal area. ♦

Roadbank Stabilization

C. H. Whittington (left), SCS, Neshoba County, Miss., and Irby Goldman, county supervisor, study a severely eroded roadbank on the R. B. Moore farm. Tons of sediment was being deposited on good bottom-land pasture. In a cooperative venture, Moore provided materials, the county provided equipment, and SCS provided the know-how for seeding the roadbank.

Whittington, above, puts on the last of the mulch material. Previously, the roadbank had been fertilized, mineralized, and seeded to common bermudagrass and lespedeza serica. Result (below): enough cover to carry the area through the winter rains without erosion damage. These pictures won a statewide Mississippi conservation photo story contest.

A Conservation Profile:

Conservationist-School Teacher Practices What He Teaches

Owner J. P. Johnson (left) and W. J. King, SCS work unit conservationist, discuss pasture improvement on the Tennessee Valley farm.

NOT ONLY does J. P. Johnson "practice what he preaches" but he also "preaches what he practices."

This Marshall County, Ala., farmer-school teacher and dedicated conservationist has been doing just that since he bought 278 acres from his dad in 1935.

"When I took over the farm it was worn out from growing cotton. I've spent my last 30 years rebuilding it," he said.

It was practically all in row crops, and erosion was taking its toll. The Soil Conservation Service helped him build terraces and gave him some kudzu for an erosion-control planting.

With this small beginning the appearance of the Tennessee Valley farm near Gunterville began to change. He planted land not suited for cultivation to grass and trees and plans to keep less than 100 acres in cultivation.

His principal crops of cotton, corn, and soybeans are planted on parallel terraced and contoured fields. About 118 acres are in pasture of Coastal bermudagrass and fescue, overseeded with white, ball, and crimson clover, that furnishes grazing for his 60 head of Hereford cattle.

The farm has increased in size to 383 acres. Mr. Johnson still holds the original deed, signed by President James K. Polk, on the 160 acres homesteaded by Johnson's great-grandparents in 1832.

As a teacher in the public schools of Marshall County, conservation was J. P. Johnson's favorite subject. During his 20-plus years of teaching he wove conservation of land and water resources into nearly all subjects.

Through the years he has been an undisputed leader of the conservation movement in his county and in Alabama. His leadership in soil conservation districts dates back to the organization of his own Northeast Alabama District in April 1941. In 1953, Mr. Johnson became a district supervisor and served as secretary-treasurer. In 1958, when Marshall County became a single county district, he was elected chairman of the board and still serves in that capacity.

In 1961-62, Johnson became area vice president of the Alabama Association of Soil and Water Conservation District Supervisors. In 1964 he served as State vice president, and in 1965 he was elected State president.

The district he heads won the Goodyear contest in 1964. During his tenure as chairman, the board has been active in conservation education and public relations activities, bought two cameras, a slide projector, a tape recorder, a bermudagrass planter, and a tree injector. The district also publishes a district newsletter.

Johnson's wife, also a schoolteacher, won the Governor's Conservation Awards Contest as the "Outstanding Teacher in Conservation" in 1965.

Even though the cattle and his 40 sows occupy most of his time now, he is still active in community service activities. When the Little Paint Creek Watershed Project was initiated, he helped to get land easements. He made talks to groups and conducted tours to help explain the program. When it was completed he was on hand for the dedication.

Soil stewardship has been a way of life for Mr. Johnson. He helped to plan and conduct many meetings, and soil stewardship materials purchased by the supervisors have been distributed to churches throughout the district.

Although he has now retired from teaching, he remains active in community service. He is president of the Marshall County Cattlemen's Association, director of the Production Credit Association, a director of the Farm Bureau, and a member of the Methodist Church.

"I never miss a chance to talk to these groups about conservation," he comments.

J. P. Johnson's dedication and interest in public service have set an example that will not soon be forgotten, and through his personal dedication to youth education and resource conservation, he has inspired others to do even more in soil and water conservation. ♦

Quality of Environment

Care of the land to stabilize and cover the soil with healing vegetation and to assure a regulated flow of clear water is a fundamental requirement of quality in environment. ♦

Edward L. Felton

Conservationist of the Year

Edward L. Felton of Holland, Va., was honored as National Soil Conservationist of the Year in the National Conservation Achievement Program sponsored by the National Wildlife Federation and the Sears Roebuck Foundation.

A board of professional conservationists picked Felton from the list of State winners previously selected by the Federation's State affiliates. He was the choice of the Virginia Wildlife Federation.

Felton has been a member of the board of supervisors of the Peanut Soil and Water Conservation District, Virginia, for the past 20 years. He is a director in the National Association of Soil and Water Conservation Districts and is vice chairman of the State Soil and Water Conservation Commission.

He was instrumental in starting the first soil conservation district newsletter in Virginia. Felton played a major role in assisting with the development of a plan for water-resource use in his home county. He has installed a soil and water conservation program on his own farm. ♦

Soil Surveys and Land Use Planning. Edited by L. J. Bartelli, A. A. Klingebiel, J. V. Baird, and M. R. Heddleson. *1966. Soil Sci. Soc. Amer. and Amer. Soc. Agron., Madison, Wis. 196 pp., illus. $2.00.*

One of the most significant recent developments in the application of conservation technology to modern resource problems is the expanded use of soil surveys. The "homely" soils inventory—once a guide for evaluating farm real estate, matching crops and soils, and determining the design of agricultural conservation measures—is now a full-fledged tool of the community planner.

In fact, says Dennis O'Harrow, executive director of the American Society of Planning Officials, "the soil capability analysis soon will be as basic to our art, and science, as the land use inventory, the traffic count, and the population projection."

This collection of papers presented at the 1965 annual meetings of the Soil Science Society of America and the American Society of Agronomy is broad in scope. The use of soils information is treated from the standpoint of the surveyor, the public official, the planner, the educator, and the planning consultant.

The application of soils data is explored in relation to community planning, urban development, regional planning, subdivision design, and highway planning and construction. Other uses are examined, such as recreation planning, the equalization of tax assessments, appraising soil productivity, and preparing zoning ordinances.

Throughout the book are many illustrations, charts, tables, and colored maps. These provide the detail needed to grasp the application of soils inventories to the complex problems of today's agricultural, suburban, and industrial growth. It becomes crystal clear, upon reading these papers, that "land has physical characteristics which often are more important than geographic location," as the book's introduction says.

It's an elementary point to conservationists, but one requiring constant and imaginative repetition. There is progress, however, for full recognition of the value of soils inventories to farm and city is on the horizon. The action of Congress in approving legislation to confirm the authority of the Soil Conservation Service to provide soils information and interpretations for nonagricultural uses is evidence of this trend.

But as recognition comes, so do demands for services. Yet less than half of our Nation's most basic natural resource has been inventoried. Although 903 million acres of the land area of the U.S. has been surveyed, 1.34 billion acres has not been mapped.

Sprawling development and waste of resources are the price of neglecting to use soils information in the community planning process—in town and in the countryside. Books like *Soil Surveys and Land Use Planning* can help us avoid paying this price.—David G. Unger, *Assistant Executive Secretary, National Association of Soil and Water Conservation Districts, Washington, D. C.*

Environmental Improvement (Air, Water, and Soil). Edited by Ralph W. Marquis. *1966. The Graduate School, U. S. Dept. of Agr., Washington, D. C. 105 pp.; paper, $1.50; cloth, $3.00.*

This book contains the texts of four lectures, and the comments of two "reactors" to each, presented in May 1966 under the auspices of the Graduate School, U.S.D.A., in the Thomas Jefferson Memorial Auditorium in Washington.

At a time of awakening interest in environmental quality, the distinguished scholars and public officials probed a broad range of questions bearing on the problem. The principal lectures are:

"Man and his Environment—Scope, Impact, and Nature," by Dr. René Jules Dubos, professor of the Rockefeller University, New York City, a microbiologist.

"Environmental Improvement—Institutional and Governmental Aspects," by Senator Edmund S. Muskie of Maine.

"Control of Environment—Economic and Technological Prospects," by John T. Middleton, director of the University of California's Statewide Air Pollution Research Center.

"The Future of Environmental Improvement," by Dr. S. Dillon Ripley, secretary of the Smithsonian Institution.—B.O.

Environmental Quality in a Growing Economy. EDITED BY HENRY JARRETT. *1966. Johns Hopkins Press, Baltimore (for Resources for the Future). 173 pp. $5.*

A dozen scholars explored the economic and social dimensions of natural resource quality at the 1966 Resources for the Future Forum.

The 12 papers are printed in a six chapter book giving us a beltway tour around the vast problem of obtaining the kind of environment we want.

What kind of environment do we want? Who pays for it and how much? Economists have answers, but so do administrators and politicians. Meanwhile, social scientists wonder how we can measure the public's preference and what kind of organizations are needed to maintain the quality of land, water, and air in the United States.

The book, academic in style and approach, leaves many questions unanswered. It shows how much needs to be done.—DUANE BALTZ, *Information Division, SCS, Washington, D. C.*

New Publications

Aerial-Photo Interpretation in Classifying and Mapping Soils. BY SOIL CONSERVATION SERVICE. *1966. USDA Agr. Hbk. 294. 89 pp., illus. $0.75.* Aerial photographs are widely used in soil surveying, farm and ranch planning, soil and forest conservation, irrigation and flood-prevention studies, timber estimates, crop-area measurement, highway planning, railroad and power-transmission location, geological research, and municipal planning.

This opportune handbook contains 15 main headings with subdivisions giving detailed instructions. Among the topics are aerial photography and surveys, photographic reproductions, perspective character of the photographs, correlating aerial photographic images with soils, soil maps for published soil surveys, photo interpretation in watershed-protection and flood-prevention programs, and a bibliography. Many aerial photographs and drawings illustrate the detailed instructions.

Action for Clean Water. *(1966). The Izaak Walton League of Amer., Glenview, Ill. 32 pp.* A citizen's guide dealing with the water-quality standards section of the Water Quality Act of 1965, resulting from the Citizens Workshops on Clean Waters sponsored by the Izaak Walton League with the cooperation of 13 other national organizations.

Bibliography on Socio-Economic Aspects of Water Resources. BY H. R. HAMILTON, D. H. OWENS, T. E. CARROLL, A. R. GLENN, AND B. A. GILMOUR. *1966. U. S. Dept. Int. Office of Water Resources Research. 453 pp.*

Soil Surveys

Wood County, Ohio. BY DONALD F. RAPPARLIE AND DONALD R. URBAN. *1966. 96 pp.; maps 4 inches to the mile (1:15,840).* Fieldwork by Paul E. Baldridge, Jr., Richard B. Jones, Kenneth L. Powell, Donald F. Rapparlie, John W. Lawrence, and John W. Van Dine.

Monroe County, Mississippi. BY L. C. MURPHREE, J. J. ANDERSON, R. M. FERGUSON, M. C. GARBER, M. G. MARTIN, K. H. MILLER, H. NICHOLS, AND R. E. FULGHAM. *1966. 123 pp.; maps 4 inches to the mile (1:15,840).*

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From the Administrator:

A No-Man's Land in Erosion Control

DESPITE the extensive system of soil and water conservation programs now available to American landowners and communities, there exist throughout the country many critical erosion areas for which there is no effective means of treatment.

Not the only ones, but perhaps most important, are eroding streambanks and roadsides and the abandoned spoil of surface-mined areas.

These numerous small and widely scattered areas discharge erosional debris, acid materials, and other pollutants onto lower-lying lands and into streams and reservoirs out of all proportion to their combined area.

They go untended not because we do not know what to do with them, or how to do what is needed. They are neglected because the treatments are generally so difficult and expensive that individual landowners do not find it worthwhile to do the work, and governmental jurisdictions lack the authority to do it at public expense.

The Soil Conservation Service has had much experience dealing with critical erosion areas in watershed and flood-prevention projects. It is necessary in these projects to eliminate major sources of sediment in order to protect reservoirs and water-control structures being installed at public expense. As part of the total watershed treatment plan, stabilizing of sediment-source areas can be cost-shared along with the structural measures.

Similarly, as part of Resource Conservation and Development projects, the stabilization of critical erosion areas usually can be accomplished with a combination of Federal and local assistance. Problems on Federal lands, of course, can be dealt with directly by the administering agencies.

But authorized watershed projects, RC&D projects, and such public lands include only a part of the national problem. It is estimated that there are some 2,125,000 miles of rural highways, 300,000 miles of eroding streambanks, and 2 million acres of nonfederally owned surface-mined areas that are serious sources of sediment and pollution beyond the reach of present corrective programs.

The President's Task Force on the Quality of the Environment recognized that soil sediment from erosion accounts for by far the greatest part of the suspended material in the Nation's rivers.

Sediment pollution increases water-treatment costs, depreciates the environment for fish, wildlife, and recreation, and destroys the natural beauty of streams and adjacent areas.

An Agricultural Research Service study in Georgia indicated that soil loss from unprotected roadsides ran as high as 356 tons per acre per year, or 16 pounds of sediment from each square foot of roadside. It is estimated that the Nation's roadsides now needing treatment are producing about 56,525,000 tons of sediment a year.

The President's Task Force identified eroding streambanks as another major source of sediment. This erosion is destroying land adjacent to stream channels valued at about $11 million annually and moving sediment into the streams at the rate of about 500 million tons a year. The problem is clearly national in scope.

The abandoned surface-mined areas in various parts of the country are an especially troublesome source of sediment and pollution. Although some States now have effective legislation requiring rehabilitation of areas currently being mined, and restoration programs are steadily improving, much of the damage done in the past still remains to be repaired.

These abandoned areas are nonproductive, eroding, and gullied liabilities to the communities where they occur. They produce sediment at the rate of up to 200 tons per acre. In addition, acid draining from the mined areas contaminates water in streams and reservoirs.

Enough experience has been gained in the limited programs already underway to show that mined areas and the resulting spoil banks can be effectively treated. It is, however, an expensive operation. The cost of applying vegetative practices alone ranges from $100 to more than $300 an acre. Also, in many cases large-scale grading operations and structural measures are needed. On many properties, onsite benefits cannot be expected to equal treatment costs. It is generally the sort of work that must be done by contract and cannot be expected to result from the usual cost-sharing available to farmers and ranchers.

Offsite benefits from sediment reduction and pollution control, however, justify action on sizable areas. Individual efforts are ineffective unless they are part of a coordinated plan. Group action is, therefore, the logical and practical approach.

It is time that soil conservation district supervisors, land use planning boards, and other local jurisdictions take a look at the problem of critical erosion areas that are being bypassed by going programs in their territories. New means of cooperative action are needed if we are to remove this blight from our rural environment.

D. A. WILLIAMS

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When the Sap Rises in the Spring

Story on page 209

When the sap rises in the spring, and Linwood B. Lesure fires up the sugar vats, he starts a round of activity that brings a stream of tourists and customers to his Ashfield, Mass., farm, where he sells maple products and Christmas trees.

A cooperator with the Franklin Conservation District, he manages his 500 acres of woodland for sustained yield of a variety of products. ♦

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Soil Conservation

DEVOTED TO THE WISE USE OF
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SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE

Careers . . . .

We pay respects this month to two career conservationists, one leaving, the other entering, the No. 2 command post of SCS.

Gladwin Young's retirement as associate administrator April 30 marks 44 years of service to the cause of sound and economic use of land and water (p. 220).

At the halfway point in a similar career, Kenneth Grant (p. 235) steps up to share the Administrator's daily responsibilities.

Water at work: A prime tenet of Gladwin Young's philosophy has been that land and water resources should serve the needs of people and that this happy result comes only to the degree that people manage resources wisely.

This is his message to the Conference on "Water for Peace" as he argues (p. 220) that the greatest opportunity for meeting growing water requirements is through more efficient use of present supplies.

This article along with his recent statement on farm drainage (December *Soil Conservation*) gives us a cogent summary of principles of water conservation.

Stewardship: Soil Stewardship Week (April 30 to May 7) always invites us to reexamine our sense of responsibility for the land resources we share in common.

A special editorial (p. 219) and the Administrator's page serve to sharpen our focus on this responsibility.

COVER: The countryside and the village that depends upon it spread out before the conservationist and land owner jointly reviewing the conservation plan for a farm in the Perry Soil Conservation District, Ohio.

Soil Conservation

Devoted to the wise use of land and water resources
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SOIL CONSERVATION is the official organ of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. The printing of this publication was approved by the Bureau of the Budget July 25, 1963.

ORVILLE L. FREEMAN — Secretary of Agriculture
JOHN A. BAKER — Assistant Secretary of Agriculture
DONALD A. WILLIAMS — Administrator, Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service,
U. S. Department of Agriculture, Washington, D. C. 20250

BEN O. OSBORN, Editor
GEORGIE A. KELLER, Production Editor

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Subscription: $2.00 per year, $2.75 foreign. Single copy, 20 cents. Discount of 25 percent on orders of 100 or more sent to same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D. C. 20402.

Focus on Conservation

(Editorial)

Conservation has become increasingly competitive.

It is competitive as to meaning.

It is competitive as to function.

It is competitive within government.

It is competitive outside government.

It means many different things to many different people.

It *is* many things to many different people.

Modify "conservation" by "natural resources" and you eliminate frill types of conservation employed by Madison Avenue—gasoline and tire mileage, armchair TV tuning, erasing washday blues, and the like.

Modify "conservation" by "renewable natural resources" and you eliminate another kind of conservation—that pertaining to coal, minerals, gas, oil, and similar resources.

"Renewable natural resources" include soil, water, trees, grasses and other plants, and wildlife.

Most of these basic resources are in the ownership and under the care of private citizens. About three-fourths of the area of our 48 mainland States is privately owned.

The conservation practiced on these lands makes it possible for all citizens to ultimately enjoy their own particular form of conservation.

Far too few of us realize that the principal guardian of our heritage of forests, soil, water, trees, grass, and wildlife is not the Federal Government, or the State conservation departments, but the millions of individual landowners throughout the Nation.

The Federal and State conservation agencies can counsel and assist the private owners, but the responsibility and the initiative are theirs. Their collective response is the reality of conservation.

In the Federal establishment, it is the Department of Agriculture that provides the conservation assistance available to the owners and managers of the three-fourths of our land that is in private ownership. The Soil Conservation Service is the principal technical agency charged with this responsibility. The 3,000 soil and water conservation districts that blanket the land coordinate and direct these conservation efforts in the public interest.

How little this is understood!

For within the realm of "renewable natural resources" are many highly specialized interest groups.

Those interested mainly in flowers or birds.

Those interested mainly in hunting and fishing.

Those interested mainly in swimming or boating or hiking, or nature study, or picnicking, or the like.

Those interested mainly in preserving wilderness areas and wild rivers.

Those who oppose all other "conservation" activities such as major reservoirs or highways or public parks that they think would harm their main interest.

Conservation is all these things and more.

It is a diverse and complex subject. It is little understood in its broad totality because it has so many adherents who see it from so many different viewpoints and view it in so many different lights.

But conservation has a common denominator. Underlying conservation in all its varieties and forms—and upon which all kinds of conservation depend completely—is the land itself and its soil and its water and its plants.

From these basics spring all forms of conservation. Without them conservation by any definition has no form or substance. Without them conservation is only a meaningless word.

Conservation begins with soil, water, and plants. They are the base.

These basic resources form the common bond joining the varied interests of all resource users, whatever may be their specialized definition of what conservation means.

Upon this base is built a policy of cooperation between the U. S. Department of Agriculture and the owners and operators of three-fourths of the American land—a policy that recognizes the legitimate ends of resource use for the benefit both of the individual and of the larger society.—H.J. ♦

Water for Peace

By Gladwin E. Young
Associate Administrator

GLADWIN E. YOUNG *is especially well qualified to write on the subject of water use and conservation because of his long experience with the economics of land and water resources.*

Upon his retirement April 30, Mr. Young ends 44 years of public service in this field, the last 14 as deputy and associate administrator of the Soil Conservation Service. He will be succeeded as associate administrator by Kenneth E. Grant (see "Conservation Profile," p. 235).

Mr. Young was especially involved with water problems during the period 1946 to 1952 when he was the Department of Agriculture representative on the Missouri River Basin Inter-Agency Committee with headquarters at Lincoln, Nebr. During this experience, he contributed to the development of concepts of watershed treatment and water management that took form as the small watershed program now administered through the Soil Conservation Service.

After graduating from Purdue University in 1923, Mr. Young was a member of the Indiana Agricultural Experiment Station Staff until he joined the Department of Agriculture in 1934.

In 1938 and 1939 he was in Washington acting in charge of the Division of Land Economics, Bureau of Agricultural Economics. He returned to Milwaukee, Wis., in 1940 as regional representative of BAE. In 1953 he was transferred to Washington and soon was appointed deputy administrator of SCS.

In 1961 Mr. Young received the USDA Superior Service Award for "notable contributions to public understanding and to national policy of the economic and physical relationships between upstream and downstream aspects of water and related land conservation, development, and use."

THE FACT that an international conference is to be held in Washington, D. C., this month under the title "Water for Peace" suggests the great importance of water to mankind's peaceful survival.

It suggests further that peace of the world could be enhanced if the nations could share their experiences and knowledge of how to deal effectively with water problems.

Man's freedoms have always been closely related to abundance of natural resources. When resources are limited, freedoms become limited. When freedoms are limited, peace is threatened.

Water shortages

As populations grow and industry and agriculture expand, water commonly becomes a crucial factor in further development. In one way or another, nearly every nation is experiencing the limiting effects of water shortage. Especially in less developed countries in the vast subhumid and semiarid regions of the world, the need for additional water is an immediate and pressing problem.

It is natural in such circumstances to look for new sources of water supply—to dream of drawing pure water from the limitless sea, of impounding floodwaters behind great dams, of diverting rivers to irrigate distant thirsty fields.

As challenging as these possibilities are, the simple fact remains that the natural distribution of rainfall and snow on the earth's surface sets the basic pattern of water supply, and the greatest opportunity for relieving water shortages is through more efficient use and management of water within that pattern.

The experience of the Soil Conservation Service in helping individual water users and small watershed communities with their water-conservation problems convinces us that there is great potential for making available water serve more needs of more people by using techniques of soil and water conservation.

To grow plants

The significance of this becomes apparent when it is realized that by far the largest proportion of available water is used for growing vegetation under natural precipitation and with the aid of irrigation systems.

If the increasing population of the world is to be served, it is going to be necessary to increase the manipulation of relatively fixed

water supplies to have water at the right places at the right times.

Nature undisturbed or unassisted is a poor provider for the wants and needs of mankind. Consider that the same land that once provided a scant living for only a few hundred thousand American Indians now provides abundance for 200 million citizens of the United States. The difference lies in the ingenuity of science and technology—products of man's brain and skill.

In the quest for a better life for more and more people in the future, even greater ingenuity must be expended toward management and conservation of water supplies.

Ancient aqueducts and canals attest to man's early efforts to manage the location of his water supply. Modern engineering and mechanical equipment have magnified such water developments a thousandfold and given us great storage reservoirs, hydropower plants, navigation channels, and irrigation systems.

The other 70 percent

All of these engineering devices are important and useful to manage water after it has run off the land on which it fell as rain or snow. But in the United States only 30 percent of the total precipitation reaches the rivers and reservoirs.

The Weather Bureau calculates that average annual precipitation, if spread evenly over the 48 mainland States, would be 30 inches a year. This amounts to about 4,300 billion gallons of water a day.

The Geological Survey calculates that streamflow is the equivalent of about 8½ inches a year, or about 1,200 billion gallons a day.

The difference between precipitation and streamflow, or roughly 70 percent of the total water supply, is used by crops, trees, and other vegetation, or escapes through evaporation into the atmosphere or seepage into deep underground storage.

Thus it becomes obvious that opportunities to manage and use water productively must begin with management of vegetation and the land on which the water supply falls. We cannot afford to wait until it runs off into rivers and reservoirs. Water must be used and reused from the time it falls on the fields and forests that make up the watersheds.

The most important use of water, next only to human consumption, is to support the plant and animal life on the land.

Although the amount of evapotranspiration can be modified to some extent, it has not generally been possible to make large changes in the "yield" of total runoff. It has been possible, however, to change the rate of runoff and to improve the quality of water by reducing the amount of sediment caused by erosion.

Control of runoff

The well-known example of the White Hollow Watershed in Tennessee demonstrates the effect that vegetation management can have on runoff. When the 1,715-acre watershed was acquired by the Tennessee Valley Authority in 1934, about two-thirds was in cutover and frequently burned forest land and the remainder in open farmland, mostly steep and eroding.

In 1958, after nearly a quarter-century of protection and revegetation, the annual sediment discharge had decreased to one-twenty-fifth the previous rate, and peak streamflows from comparable storms were reduced significantly. There was no decrease in the volume of surface runoff or groundwater flow and no lowering of the ground-water levels.

Special management practices, however, have been successful in increasing water yield from experimental forest areas. At the Coweeta Hydrologic Laboratory in North Carolina, trimming back annual growth increased water yield 10 inches a year as compared to adjacent untreated areas. At the Fraser Experimental Forest in Colorado, alternate-strip clear cutting increased annual streamflow by 25 percent during the following 8 years. These increases in water yield were accomplished without significant increases in sediment production.

In many farming areas, the widespread adoption of conservation practices has made striking reductions in the sediment loads of streams, improving the quality of the water and reducing the rate of filling of reservoirs.

Irrigation's share

One of the biggest opportunities for water savings is in irrigation agriculture, for irrigation is the Nation's largest user of water.

In the United States, withdrawals of water to support agriculture exceed those for industry. The amount of water "consumed" by irrigation is nearly 30 times the amount that disappears in industrial use.

But only a small part of the withdrawn water is actually used productively. An improvement in the efficiency of irrigation water use could be equivalent to a major addition to our water supply. Even greater opportunities for water conservation through improved irrigation methods exist in other countries.

On the average in the United States it requires 1.7 acre-feet of water delivered to the root zone of each acre of land to produce a crop. Under prevailing practices today, a total of 6.6 acre-feet of water is withdrawn for each acre irrigated. The difference, 4.9 acre-feet, is lost to seepage and evaporation before the water is delivered to the root zone.

Allowing for the re-use of water that is recovered from seepage and tailwater from excessive irrigation, only about 43 percent of the water withdrawn actually reaches the intended place in the soil for crop production.

The Department of Agriculture estimates that the average gross withdrawal of 6.6 acre-feet could be reduced to 3.6 acre-feet by the year 2000 by the application of a vigorous program of conservation practices. Such an improvement in efficiency would make it possible to irrigate 20 percent more land with the same withdrawals of water.

The principle of using water again and again from the time it falls on the land until it reaches the sea is fundamental to getting the maximum benefit from the available supply.

About three-fourths of the land area of the United States, exclusive of Alaska, is owned by private citizens who make the final decisions about its use.

Public interest

The public has a vital interest in how the actions of these landholders affect the general water supply. This interest is expressed through cooperative programs between the Federal Government and individuals and groups of landholders, and with State and local governments that exercise some control over landholders. The soil and water conservation programs are administered mainly by the Soil Conservation Service on the part of the Federal Government and are carried out through conservation districts and small watershed projects representing the landholders.

They profoundly affect the impoundment, distribution, and control of the 30 percent of our water supply that runs off the land into the streams and can be manipulated for irrigation, drainage, flood prevention, urban water supply, farm ponds, recreational use, and in many other ways.

More importantly, the management of vegetation and soils influences the use and conservation of the 70 percent that is held on the land and is returned to the atmosphere or underground storage without appearing in impoundments or withdrawals for specific uses.

Obviously, the greatest opportunities for coping with water shortages lie in more efficient methods of manipulating the supply that comes to us in the natural course of the hydrologic cycle, rather than in storing and transporting water after it leaves the land where most of it needs to be used. ♦

Sediment Brings Early Death by Strangulation to Colonial Port

By John N. Holeman
Geologist, Engineering Division, SCS, Hyattsville, Md.

ONLY the abandoned home of the harbormaster remains today as a relic of a Maryland colonial port that once handled more trade than Baltimore, 16 miles to the south on Chesapeake Bay.

Stately Rumsey Mansion, built in 1721, now stands vacant amidst ancient trees shading a cool lawn that stretches a hundred yards to the shore where ocean-going ships once docked at thriving Joppa Town, Md.

Now one looks a mile across marshy mudflats to the nearest open water—and that too shallow to float a cargo-laden vessel. Within less than a century after farming began in the area, sediment had choked the protected harbor in the estuary below Gunpowder Falls and the county seat shifted from Joppa Town to Baltimore.

The story of the strangulation of Joppa Town by sediment is repeated in the history of dozens of other early-day settlements on the estuaries and navigable rivers of the Atlantic seaboard. The process continues even today. The Soil Conservation Service estimates that 4 billion tons of soil is eroded from the land of the United States annually. Almost a fourth of this amount is carried by rivers to the sea.

To understand what caused the death of Joppa Town, a brief review of the local history is in order. Before the Europeans came to this area, some of the Indians practiced a rudimentary agriculture which had no effect on erosion rates.

From the first permanent English settlement at Jamestown in 1607, the colonists spread out slow-

New homes are now being built within a few yards of the original shoreline of old Joppa Town harbor.

ly over the tidal areas surrounding the Chesapeake Bay. With axes and fire they cleared the forest to make way for farming. Most of the land was planted to tobacco.

By 1700 most of the local Coastal Plain had been claimed, and newcomers began to settle above the "fall line" that marked the upper limits of navigation on the rivers. It was at the fall line that wharves, warehouses, and communities developed.

The very activity, the growing and shipping of tobacco, that created the towns also contained the seeds of their doom.

Planters found that after five or six crops of tobacco were grown on a newly cleared field, the yield and quality of the crop declined sharply. Then a new field would be cleared and the impoverished one abandoned, for it was easier to move to new land than to maintain or restore the productivity of the old. The clean-tilled tobacco fields, even after abandonment, were susceptible to excessive erosion.

Soon the streams became muddy and the sediment was carried on into the estuaries and bays. There, where the velocity of streamflow

This aerial photograph, made in 1957, shows the deposit of sediment in old Joppa Town Harbor. From historical records the location of three previous shorelines have been determined: Precolonial (solid line), 1846 (dotted line), and 1897 (dashed line). The area filled in between time of settlement and 1846 is shown by cross hatchure; from 1846 to 1897 by diagonal hatchure.

Rumsey Mansion, built in 1721 and now vacant, is the only remaining building of Joppa Town. Ocean-going vessels once docked at the original shoreline at the water's edge in the picture.

was reduced, the greatest deposits of sediment occurred in the tidal headwaters. Several open-water ports that might have become thriving cities were converted into mudflats, in some cases within 50 years of their establishment.

The estuary at Joppa Town originally was deep enough to make a good harbor for ocean-going ships. In the early days the wharves were piled high with hogsheads of tobacco. The largest merchantmen loaded there and sailed to various parts of the world.

In 1712 a courthouse was built, and Joppa Town was the thriving seat of Baltimore County. It seemed to be a town with a bright future.

Instead, the exploitation of the land for tobacco and corn initiated a cycle of erosion that rapidly filled the upper portions of the harbor. Decline of the town began about 1750, and the county seat was moved to Baltimore in 1768.

When new bridges were constructed across the Gunpowder River in this area in the early 1900's piles were sunk 60 to 70 feet into the mud without hitting the old bottom. Recently only a pile of stones could be seen as the remnants of an old wharf, now a mile and a half inland from the navigable tidewater. All of the land between the wharf and the tidewater consists of soil washed down from the 430 square-mile watershed.

Times have changed and sediment washing into the estuary is no longer excessive as it once was. A sedimentation survey of two large reservoirs in the watershed made by the Soil Conservation Service in 1961 found that the average annual sediment yield for the period 1944 to 1961 was less than a fourth of the rate for the preceding 29 years. Details of this study are reported in "Sedimentation of Loch Raven and Prettyboy Reservoirs, Baltimore County, Md." (SCS–TP–145). The reduction in sediment movement is attributed to conservation measures and changed land use.

Accumulation of sediment is nothing new; it is as old as the oceans and the continents themselves. There have been erosion and resulting sediment deposition ever since the surface of the earth cooled from its original molten mass.

Ancient rocks exposed at the surface in the Gunpowder watershed were once sediment.

The accumulation of these water-borne clays and sands occurred slowly; the contents of one rock stratum probably were deposited over hundreds of thousands of years. Such normal, or geologic, erosion and sedimentation are no threat to our interests today; it is the rapid, man-induced erosion and sediment accumulation that require our attention.

On the 9.7 million acres in the first 157 small watersheds authorized for installation of protective measures under the Watershed Protection and Flood Prevention Act, the sources of sediment were found to be 73 percent from sheet erosion, 10 percent from gully erosion, and 17 percent from erosion of roadsides, streambanks, flood plains, and the like.

Structural measures installed in watershed projects control runoff, on the average, from 40 to 60 percent of the drainage area. Land-treatment measures on the watershed reduce erosion by as much as 50 percent, and the structures stop about 90 percent of the sediment reaching them. Together the land-treatment and structural measures may be expected to reduce the sediment yield from a watershed by about 55 percent.

The SCS estimates that about 1 billion acres of land area of the United States needs some treatment or protection. At the rate the small watershed projects are being installed, nearly 15 percent will be protected by 1980. Conservation plans have been prepared by nearly 2 million cooperators covering 650 million acres of land. Two hundred and ten million acres of this land has now been adequately treated by the application of land-treatment and structural measures for the reduction of erosion and sediment. ♦

Teamwork Approach Used in Streambank Stabilization

By David Oberwager
Work Unit Conservationist, SCS, Baggs, Wyo.

THROUGH a teamwork approach the landowners in Wyoming are reducing erosion by stabilizing streambanks along the Little Snake River.

Much of the irrigable land is low-lying along the river, and damage comes from high water and huge ice jams during the spring runoff season.

Damage usually occurs in the form of erosion of banks and flooding of high-producing meadowland. The large ice flows sometimes tear out huge chunks of meadowland, in places cutting away as much as 30 to 40 feet of bank a year. In other places, excessive scouring of the channel bottom causes lowering of the water level which leaves irrigation diversion points high and dry.

Cooperators of the Little Snake River Soil and Water Conservation District are making use of technical help from the Soil Conservation Service and financial aid from the County Agricultural Stabilization and Conservation Committee on such problems.

Timely streambank-protection measures averted serious damage on two canal company ditches that carry water to about 60 ranches in the valley.

The Little Snake River may cut as much as 30 to 40 feet of bank in a year.

In the "combination" streambank protection method, steel railroad pilings are driven and backfilled with trees and brush.

Many individual landowners have completely arrested the river damage after it occurred while some have prevented future damage by installing protection before sustaining loss.

Flooding has been greatly reduced in some areas by the lowering of the river channel by natural cutting, but loss of land from scouring and cutting along the banks continues.

On the Roger Reed Ranch, a new diversion headgate and rock diversion had to be constructed because scouring had lowered the river channel, leaving the original headgate position 3 feet above the river bottom.

Three methods of streambank protection are used: Blanket, jetty, and a combination of these. The objective is to stabilize the banks by keeping the main erosive current away from them.

In the blanket method, the banks are usually sloped about 4 to 1 before laying trees or rock in place. Material is placed up to 3 to 5 feet beyond the top of the bank to allow for settling and to take care of extremely high water. Native willow cuttings are put into the

bank along the upper edge of the riprap.

In the rock jetty method, rocks 2 to 3 cubic yards in size, are set out into the stream by a bulldozer. Smaller rocks are used to fill in the voids between the large rocks. The average jetty on the Little Snake River is 35 to 45 feet long and 8 to 15 feet high, depending on bank elevation. The jetty is keyed into the bank about 8 feet. A natural slope is developed with rocks working from a base width of 30 feet.

The angle of the jetty is usually determined by the degree of the curve in the river. Sharper curves need more jetties, spaced closer together and at a straighter angle to the current. It is important that the jetties do not extend too far into the main channel, causing a funneling effect or restricting the river flow. They must extend far enough to deflect current away from the bank, each jetty catching the bounce from the one above until a reasonably stable stretch of river bank is reached.

When rock jetties are used, no bank sloping is necessary since reduction in velocity on the downstream side of the jetty will cause sediment to deposit and allow willows and grass to start growing on the banks within a few years. Hand seeding and planting speeds up the process.

There have been no failures to date in the rock jetties, even when severe ice jams develop during the first year after installation. This method is by far the most expensive ($4.50 to $6.50 a cubic yard) to install but it may prove least expensive over a long period because of lower yearly maintenance costs and a much longer life span than other protective measures.

The "combination" method consists of driving 90-pound steel railroad rails into the stream bottom at 10-foot spacings along the bank and backfilling with trees and brush. This has been successful to a degree, but severe ice jams can break off some of the rails and cause "blowouts" in the protected area. No bank sloping is used in this method, and less meadow is lost or disturbed. The brush and trees used as backfill often sprout and take root with many sucker-like stems acting to trap the silt load. These jetties or blankets are effective only as long as the trees and brush remain in place. ♦

Time-Saving System for Land Grading

Carol Aymond, center, discusses a land-grading operation on his farm with Work Unit Conservationist Coy McClung, (left), Marksville, and Andy Sharp on instrument, (right).

Carol J. Aymond, Avoyelles District cooperator at Cottonport, La., has sharpened his land-grading methods with a time-saving twist, while rounding out his conservation program with grading on his sugarcane fields.

Aymond's system saves time for land-grading equipment operators, as well as for SCS technicians. He sets a stake on each grid intersection marked with either red or blue stripes. Each stripe represents a tenth of a foot. Three red stripes on a stake call for a cut of 0.3 foot; two blue stripes mean a fill of 0.2 foot, and so on. His drivers read what is to be done from the seat of the machine while driving. Checking the job and correcting small differences are a breeze.

District soil conservationists laid out a land-grading job on 13 acres of a 320-acre place Aymond bought in 1964. He liked the results so well he bought his own 5-yard scraper and graded 196 acres of his sugarcane land with his own farm tractors.

Better water management gives him better quality cane by eliminating water scalds, earlier starting in the spring, better weed control, easier maintenance of drainage ditches, and uniform yields over the whole cut of land.

Sound planning, hard work, and good management on his 200 acres of sugarcane, 100 acres of cotton, and 250 acres of soybeans earned him the Avoyelles District selection as outstanding conservation farmer for 1965 and the Goodyear Tire and Rubber Company recognition award. — James Martin, *Area Engineer, SCS, Denham Springs, La.* ♦

Cropland Adjustment

Financial assistance is provided through the Cropland Adjustment and Cropland Conversion programs to assist farmers in the conservation and economic use of land and to aid States and local governments in acquiring cropland for open space, natural beauty, wildlife, or recreation developments. ♦

Erosion Control Means Money to Wheat Farmer

By Edgar F. Baumann
Work Unit Conservationist, SCS, Pendleton, Oreg.

FOLLOWING unusually heavy winter rains in Southern Umatilla Soil and Water Conservation District in Oregon, SCS conservationists at Pendleton set out to get some answers to the basic, down-to-earth question: "What's the dollars and cents value of conservation?"

Soil scientists working in that eastern Oregon wheat-growing area had observed for years the serious erosion on sloping wheatlands. But they wanted facts and figures to support their observations.

They chose for study a field in the Speare Canyon area 18 miles west of Pendleton. The soil was Condon silt loam on a north slope of 7 to 20 percent.

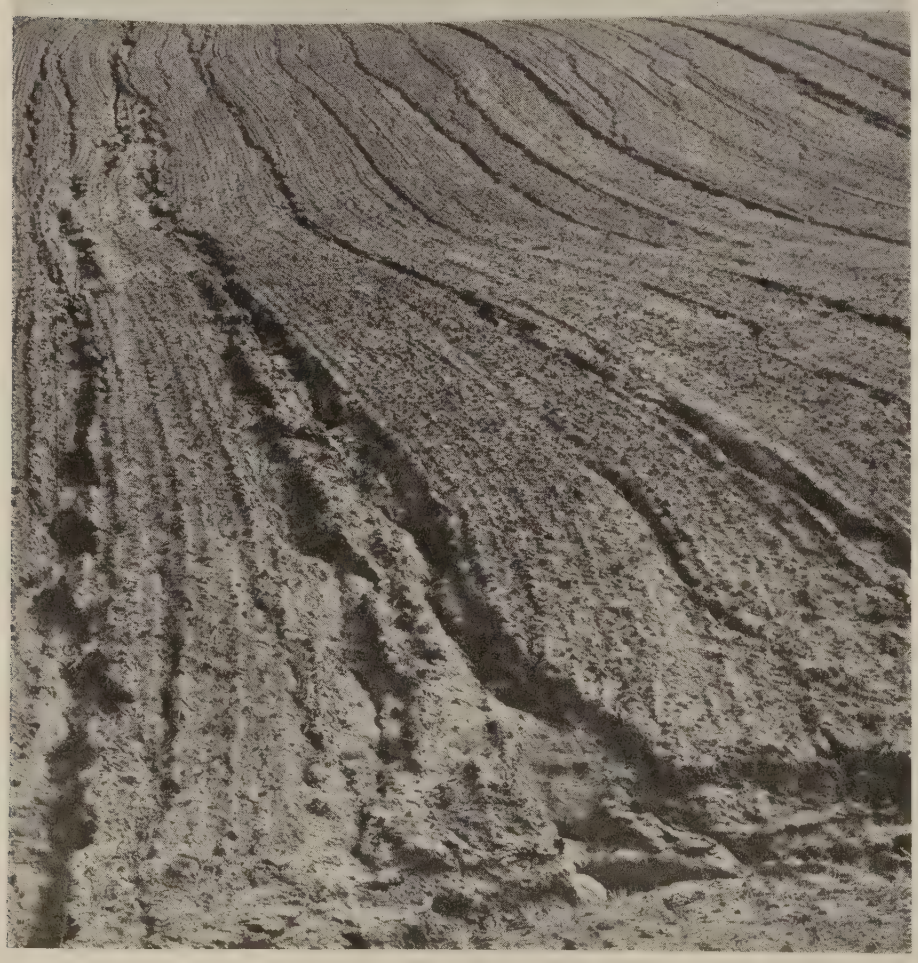
Winter wheat had been seeded late in October and November the previous fall because rainfall was inadequate at the usual seeding time in September and early October. Unusually heavy rains totaling more than 6 inches—of 50-year frequency—occurred in December and January causing heavy runoff and much soil erosion.

In March, the conservationists made measurements and estimated the soil loss on the field at 165 tons an acre, equivalent to 1.1 inch of topsoil from the entire area.

Rill and gully erosion was so severe on 40 acres of the 160-acre field that the wheat yield there was only 10 bushels an acre. The other 120 acres, only slightly eroded, yielded 42 bushels an acre.

Hence, it was concluded that erosion on the eroded 40 acres had reduced the farmer's harvest by 32 bushels an acre or 1,280 bushels of wheat. With wheat at $1.50 a

Severe sheet and rill erosion removed an average of 165 tons of soil an acre from this field of sloping Condon silt loam during heavy rains in the winter of 1964-65. At harvest time (right) the rills still show through the wheat.



Diversion terraces, such as this one on the Ray Warren farm (above), do an effective job of controlling erosion on sloping wheatlands. Streambank erosion (below) is a common problem in eastern Oregon. At this spot on the Umatilla River 5 acres of a fertile alfalfa field was lost in one flood.

bushel, the gross monetary loss was $1,920. Charged against the entire 160 acres, this amounted to $12 an acre.

What would be the cost of a conservation program adequate to prevent such loss of income? The conservationists made some estimates for the field being studied.

A sound conservation program for the field would require 5,000 feet of diversion terraces and 1,700 feet of grassed waterways. The estimated cost of these two practices would be $1,510. The Agricultural Conservation Program payment would be $955, leaving a net cost to the farmer of $555 or $3.50 an acre. In addition, he would need to plant on the contour and to seed wheat early in the fall if moisture was adequate. These practices would add little to his expenses.

The author measures rills and calculates soil removal from the study field.

Thus, a sound conservation program on this field in 1964-65 would have increased the gross income $8.50 an acre. Plugging the holes in farm income through a conservation program is something each individual can do.

Lou Levy, manager of the Cunningham Sheep Company lands, is one operator in the area who intends to do just that. Erosion was serious on the company's wheatlands. Plans are being made now to install diversion terraces in the seriously eroded areas. Other conservation practices that are effective in controlling erosion include stripcropping, grassed waterways where needed, and conversion of poor grain-producing areas back into grass.

Making a conservation program really pay requires positive action.

"Terracing is one of the best methods to reduce water erosion in this area," says C.J. Gilbert, an advisory supervisor on the district board. "If farmers built more terraces on the long slopes, they could reap higher yields while preserving precious soil for future generations." ♦

Soils Contests Train Students

CORNELL UNIVERSITY, Ithaca, N. Y., is the host institution for the Seventh National Soils Contest on May 4 to 5.

College undergraduates studying agriculture who compete in the contest have the opportunity of traveling widely in the United States and observing many different soils in contrasting regions.

For the soils contest, the United States is divided into seven regions. Within each region, regional soils contests are held. The two winning teams from each region compete among regions on a national basis.

Many of these teams travel extensively. Some of them go to different States in widely separated areas of the country. This gives each participant an opportunity to make a detailed examination of many different soils.

Soils teams are generally coached throughout the year. Regional contests are usually held in the fall and national contests in the spring. Before each contest, the host institution holds tours that inform contestants of the various soils and landscapes in the contest area. These tours are conducted by local scientists of the Soil Conservation Service and Land-Grant Colleges. Soil characteristics are explained and questions are answered.

During the contest three or four pits exposing soil profiles are examined. Contestants dig into the soil and describe each soil characteristic carefully. Each contestant must evaluate and record on a scorecard certain site characteristics that include position of site, parent material, slope, erosion, and surface runoff. Scorecards are immediately corrected by a panel of experts from the Soil Conservation Service and Land-Grant College.

The winning teams and highest scoring individuals receive awards or recognition at a banquet on the evening of the contest. Trophies and awards for the national contest are presented by the American Society of Agronomy.

Soil Conservation Service student trainees consistently do well in these contests. The student chairman of the 1967 contest at Cornell University, Thomas M. Ballagh, worked for SCS last summer as a soil scientist trainee at Watertown, N. Y. ♦

Lettuce Harvesters Aid Truck Farmers

Two cooperators of the Oswego Soil and Water Conservation District, N. Y., who grow truck crops on muck soils have purchased two lettuce harvesters. To use the new equipment efficiently, they converted their drainage systems from open drain to tile.

The revised drainage system makes possible eight more rows of crops an acre and permits better weed control. Use of the new machines keeps hired help gainfully employed, puts a cleaner product in the box, and increases profits.

The cooperators credit assistance from the Soil Conservation Service and the district with making all this possible. ♦

Level Basin Systems Reduce Wastage of Irrigation Water

By M. J. Bossuyt
Work Unit Conservationist, SCS, Casa Grande, Ariz.

FARMERS in the West Pinal Soil Conservation District of Arizona are turning increasingly to the "basin" system of irrigation to reduce wastage of water.

Alarmed at falling water tables and pressed by rising labor and water costs, irrigators are using other improved methods also — sprinkler systems, adjusting syphon hoses to the different rates of water intake of different soils, return and reuse of tailwater, and the like. But the basin system generally gives the greatest gains in efficiency of water use.

Authoritative sources estimate that the average efficiency of irrigation in the United States is less than 50 percent—that is, less than half the water applied to fields is held in the root zone where it is used by crop plants.

With the basin system, West Pinal District cooperators have attained efficiencies of 80 percent and more. Water savings have amounted to as much as 50 percent of the amount applied, where conservation methods are followed.

In the basin system, the field is divided into segments, each completely enclosed by border dikes. Each resulting basin is watered separately. The surface in each basin is graded level, allowing not more than 0.2 foot of total fall lengthwise and not more than 0.1 foot per 100 feet crosswise. As a result, the water covers the entire basin at about the same depth and no water escapes from the enclosure. There is no tailwater from a basin irrigation system.

After converting from a conventional open-ditch system, Cooperator Ed Farrell commented, "I now use one-fourth the time and save one-half the water."

Under the old system, it took 12 hours for the water to reach the end of the furrows and 12 hours more

There is no waste of water from this field on the Jim Pate farm in the West Pinal Soil Conservation District. Jim Alam, SCS soil conservationist, inds the water evenly distributed for maximum usage.

Tailwater is wasted from a field (left) where the slope is too great to allow irrigation water to soak into the soil before it reaches the end of the rows. SCS technicians (right) test the infiltration rate of a field to determine correct rate of water application.

to "sub up" to the seedbed on the ridges. Now he completes the irrigation of a set in 6 hours. Because he has no tailwater, he is smoothing out his tailwater return ditches and incorporating the land into the field.

Fred Enke is another farmer who has converted from the conventional slope system to basin irrigation. His soils are fine-textured with water intake rates of less than 0.25 inch an hour. He had difficulty getting water into the soil with the old system. The basin system cut his water costs from $70 to $30 an acre.

In the West Pinal District, average water costs, excluding maintenance and repair, are between $50 and $60 an acre, at approximately $5 to $7 per acre-foot. This means that farmers are using 7 to 10 acre-feet of water per crop with the conventional slope method of irrigation.

With properly designed level basins and adherence to proper irrigation principles, conservation farmers are using about 4 acre-feet of water per crop. In addition, the water is distributed more uniformly throughout the plant root zone, resulting in better environment for effective plant growth and greater net returns from the crops. ♦

Cattle and Recreation Compatible on Ranch

Livestock and commercial recreation can be compatible, Donn Bonnheim learned when he developed recreation on his 6,500-acre cattle ranch west of Paso Robles, Calif.

Bonnheim, a cooperator of the Las Tablas Soil Conservation District, with the help of the SCS, worked up a conservation ranch plan and built six farm ponds, developed eight springs, and cleared brush from about 200 acres and seeded it to grass.

He observed an increase in wildlife as the conservation progressed. Deer hunting improved, coveys of quail grew in size and number, ducks stopped over on the farm ponds, and more doves took advantage of the improved feed and water conditions.

Adding commercial recreation to his ranch operations, Mr. Bonnheim in 1963 leased the recreational facilities for 1 year to a club of 20 members. After the first year, a new lease was signed for 4 years, and membership increased to more than 30 guests.

Activities for club members include camping, hiking, hunting, and fishing, with a limitation of one deer, one wild hog, and daily quotas of quail, doves, pigeons, and ducks for each hunter during the hunting season. Fishing is permitted at all times.

To further increase ranch income, he planted pheasants and chukars, provided by the California Department of Fish and Game, to be hunted as their population increases. He plans a large dam that will provide a reservoir for recreation and irrigation.

"By the end of the current 4-year contract, income from recreation should exceed income from my 350-cow livestock operations," says Donn Bonnheim.—RAYMOND C. COOPER, *Work Unit Conservationist, SCS, Paso Robles, Calif.* ♦

Government Loans Help Low-Income Rural People

Rural loan programs, authorized by the Economic Opportunity Act for developing small farms and businesses and obtaining cooperative services, assisted more than 21,600 low-income rural families during 1966.

A total of $24.2 million of these loans, administered by the Farmers Home Administration, were made to nearly 15,500 low-income families to start small businesses or improve their farming operations.

Also 336 loans totaling more than $3.5 million were made to rural cooperatives serving more than 6,124 families. ♦

Conservation Practices Help Boys Town

BOTH KINDS of conservation—human and soil—are practiced at Boys Town, Nebr.!

"It looked like an eroded sunflower patch when I first walked over it back in the early forties," said Cal Jorgensen, SCS work unit conservationist in the Douglas Soil and Water Conservation District. "Only a prophet could have foreseen this land becoming Douglas County's 1966 Conservation Farm of the Year."

Neglect through the years had left the hilly land badly eroded and low in productivity.

Father Flanagan, founder of Boys Town, and Farm Manager Robert Steffen realized the conservation job ahead was a big one. Beginning in 1942, they cooperated with the conservation district in developing a farm conservation plan.

Steffen says, "We worked closely with the soil conservation district and SCS technicians in following this plan through the years. When the need to revise or update a practice was evident, like widening our terraces to accommodate newer equipment, we did it. We have found that continual maintenance of our practices makes conservation work best."

Today, in place of the "eroded sunflower patch," you can see tree plantings, wildlife habitat, field border plantings, and drainage ditches. There are almost 900 acres farmed on the contour, 40 miles of terracing, and more than 50 acres of sod waterways. Corn followed by an alfalfa-grass mixture is the cropping system. There is always about 400 acres of good pasture. A manmade lake provides fishing and boating.

Boys Town's 30-acre manmade lake (above) is used for boating and fishing. This is the largest manmade lake in the Douglas Soil and Water Conservation District. With minimum tillage and crop rotation practiced (below), this contoured and terraced field is protected from erosion.

These conservation practices paid off in 1964 when a 6- to 10-inch rain fell within a 2-hour period in the Omaha area. Seven lives were lost, and damage to the land and to many houses in the Papillion Creek drainage area was estimated at $7 million. Hell Creek, a part of the drainage area, originates just north of Boys Town and flows through it for 1½ miles. Because of proper conservation practices, the Boys Town land weathered the storm with practically no damage. ♦

"Soil, Water, and Suburbia" Is Topic of Joint Conference

SOIL AND WATER problems that once seemed to conservationists as almost entirely rural, but which now are recognized as equally pressing in urban and suburban areas, will be the subject of a conference on "Soil, Water, and Suburbia" June 15 and 16 at the Jefferson Auditorium, Department of Agriculture, Washington, D. C.

Secretary of Agriculture Orville L. Freeman and Secretary of Housing and Urban Development Robert C. Weaver will appear on the program.

The two departments are jointly sponsoring the conference. Land developers, investors, planners, architects, engineers, scientists, and county and municipal leaders are being invited to attend.

The two Secretaries, in announcing the meeting, said:

"Critical problems of damage, waste, and future extra municipal costs are arising in countless urban communities because of methods presently used in many developments in the fringe area between urban and rural America.

"We hope that this conference may take a start toward accelerated solutions, throughout the country, of the many problems created by ill-planned or unplanned suburban and exurban growth, where staggering amounts of eroding topsoil are polluting our rivers, our recreation and fishing areas, and our drinking intakes.

"The conference is being planned to cover all major phases of soil and water management in connection with land development, provide practical information for planners and developers, determine needs for additional research, and improve channels of communication with developers and others concerned with rural-urban fringe areas. In these and other ways we hope to help them:

"—cut construction and other costs,

"—reduce health hazards,

"—protect and enhance natural beauty and provide open green space,

"—reduce erosion, flood, and sediment damage,

"—control one major source of water pollution." ♦

USDA Contracts for Sediment Research

Engineers at Pennsylvania State University, University Park, will develop mathematical formulas for calculating the movement of sediment in streams under a $28,106 research contract awarded by the U. S. Department of Agriculture.

Sponsored by USDA's Agricultural Research Service, the 1½-year program will be conducted by Samuel Shulitz, of the University's Civil Engineering Department. Donald E. Whelan will be the ARS technical representative.

Mr. Shulitz will concentrate on sediment movement in small, unstable channels common to agricultural watersheds. Excessive upstream channel erosion by gravel and rocks causes two main problems—(1) sediment buildup in downstream channels, and (2) flooding of agricultural lands with excessive sediment deposits in reservoirs. ♦

Greenspan Helps Schools Buy Land for Recreation

Under a Greenspan agreement with USDA, the Murdock Public Schools in Swift County, Minn., about 100 miles west of Minneapolis, are buying 7.5 acres of cropland for recreation and beautification.

These schools plan to plant trees on 5.4 acres and seed to grass or other vegetative cover the remaining 2.1 acres.

The grant from Greenspan will be $667.51, or about a third of the $2,250 purchase price. Greenspan is part of the USDA's Cropland Adjustment Program that authorizes help to public entities desiring to obtain land in surplus crops for permanent conversion to open space, public recreation, and so on.

USDA will also provide $122.58 in cost-share assistance to the schools in planting the trees and vegetative cover. ♦

Country Church Rallies to Save Watershed Plan

A COUNTRY CHURCH in the Lincoln County Soil Conservation District in southeastern Kentucky rescued hopes for outdoor recreation centers sorely needed by communities in the Buck Creek Watershed Project.

When local interest wavered in the face of costs to be shared for the $890,000 program, parishioners of tiny St. Sylvester's Roman Catholic Church heard Father Herbert L. Uphaus describe the two proposed dams and 36,000-acre land treatment. He said the move expressed a birthright passed along to them by their soil-loving Swiss and German forebears.

"Beautiful new lakes, recreation features, and the well-tended hillsides will help to hold our youngsters here at home," Father Uphaus said. "Dams, too, will unify our community; they'll protect us all like miraculous umbrellas each time the floodwaters threaten."

Laymen led by Tom Schuler, member of the Lincoln County District, set up a nonprofit Buck Creek Foundation. Embracing all civic interests including 670 farmers in the project area, the group offered family usage permits for the planned recreation sites.

Eagerly accepted at $45 apiece, the shares climbed to a total of $5,000, sufficient to help secure all easements and rights-of-way needed for construction operations.

Building of a flood-retarding dam with a permanent pool of 40 acres began. Another flood structure impounding 30 surface acres of water was designed. Conservation work improving 9,000 acres of pasture and 1,500 acres in woodland was hastened. To protect the dams, modest-income farmers used Appalachia "speed-up" funds. Quickly, the measures satisfied 50 percent of the land-planning aims.

Dreams pursued by parishioners of St. Sylvester and their neighbors are flowering elsewhere in the locality as the rural area develops.

Stanford, the county seat, has been named one of six "All-Kentucky Cities" for 1966.

A new mobile home plant employing 100 workers has begun operations.

Just completed is a 9 hole community golf course with a clubhouse, swimming pool, and two fish ponds.

A new youth center and park is being completed by local community groups.

A 30-bed extended-care facility is being added to the new 50-bed hospital. Land has been obtained for construction of a personal care home for 40 elderly residents.

Stanford's new water system has just been tripled in capacity, and a new sewage treatment plant is now under construction.

Eighty-six acres of land has been purchased for additional industrial development.

A new water district has begun supplying the nearby towns of McKinney and Hustonville.

The spirit and will to move ahead in community development came directly from local people themselves; the life force might be called "soul" conservation in Father Uphaus' view.—LUTHER C. GABBARD, *Work Unit Conservationist, SCS, Stanford, Ky.* ♦

A Conservation Profile:

New Associate Administrator Is a Career SCS Conservationist

THE NEW associate administrator of the Soil Conservation Service, Kenneth E. Grant, is a career conservationist who at age 47 already has more than 20 years' experience in public service to his credit.

In announcing Grant's appointment to succeed Gladwin E. Young upon his retirement April 30, Secretary of Agriculture Orville L. Freeman said Grant has done an "outstanding job" as SCS State Conservationist in Indiana, a position he has held since June 1964. Previously, he was State Conservationist in New Hampshire for 2 years.

The Secretary cited Grant's "exceptional leadership" as the Department of Agriculture's representative on the Ohio River Basin Studies, first of its type to be completed, the Inter-Agency Committee for the Wabash River Basin, and the technical advisory committee of the Wabash Valley Interstate Commission.

Other accomplishments by Grant cited by Secretary Freeman included leadership in developing the first Resource Conservation and Development Project in the Nation (Lincoln Hills Project in Southern Indiana) and in stimulating accelerated cooperative efforts of local, State, and Federal agencies in multiple-purpose watershed projects.

Grant is a native of Rollinsford, N. H. He received a B. S. degree in agriculture, with a major in agronomy, from the University of New Hampshire, in 1941, and a Master's degree in public administration from Harvard University in 1964.

He worked as a Department of Agriculture collaborator in 1941 while a graduate assistant at the University of New Hampshire. He served in the United States Army from December 1941 to October 1945.

Kenneth E. Grant

Grant joined the Soil Conservation Service as a junior soil scientist at Keene, N. H., in 1946. He rose rapidly through the ranks, from work unit and area conservationist positions, to the State technical staff. He became deputy State conservationist in 1956 and was promoted to State conservationist in 1959, holding that position until his promotion and transfer to Indiana in June 1964. ♦

People a Dominant Factor

The SCS recognizes *people* as a dominant factor in each local resource situation and as the reason for conservation itself. The resources of soil, water, plants, and wildlife are significant only as they provide for the needs of people. ♦

Senior Citizen Keeps Love of Land

Mrs. Cora Finister agrees with SCS Work Unit Conservationist Ellis Dawson that soil is the basic resource of her farm.

BEING a senior citizen hasn't dampened the conservation zeal of Mrs. Cora Finister.

One of the oldest cooperators with the Lower East Red River Soil and Water Conservation District, Louisiana, she says, "The conservation of our soil, water, and forests should be the concern of every American, old or young, rich or poor."

Mrs. Finister retired in 1948 after teaching school for nearly 50 years. She lives on her 13-acre farm in LaSalle Parish where she was born 88 years ago.

The daughter of a slave who came to Louisiana after the Civil War, she has never lost an appreciation for the soil that she learned in her childhood almost a hundred years ago.

"At that time I recognized that our land was wearing out after 70 years of farming," she says. "Cotton, corn, and potatoes were our cash crops, and we had to take care of our land so it would take care of us."

In 1951, Mr. and Mrs. Finister became cooperators with their soil conservation district. J. E. Cammack, Soil Conservation Service technician, now retired, assisted them in developing a conservation plan.

The practices planned, and later applied, on the Finister farm were terracing, contouring, cover cropping, and managing crop residues to put back what was taken out of the soil. "Someone else has farmed my land since my husband's death in 1954, but my love for the land has continued, and I have watched over it closely," she explained.

Mrs. Finister says she wants to die on the land that she loves so well.

"It gives me peace of mind to live close to the land that is so much a part of me," she says. Most of her activities are now confined to raising a garden and reminiscing of days in the past.

But she is quick to respond to the question, What does the soil mean to you now? "It's something that gives me hope that come next spring flowers will bloom, trees will grow, Nature's handiwork will be about us, and I will have a place to put my seed for another year." ♦

REVIEW

Environmental Improvement (Air, Water, and Soil). EDITED BY RALPH W. MARQUIS. *1966. The Graduate School, U. S. Dept. of Agr., Washington, D. C. 105 pp.; paper, $1.50; cloth $3.00.*

This book contains the texts of four lectures and the comments of two "reactors" to each, presented in May 1966 under the auspices of the Graduate School, U.S.D.A., in the Thomas Jefferson Memorial Auditorium in Washington.

At a time of awakening interest in environmental quality, the distinguished scholars and public officials probed a broad range of questions bearing on the problem. The principal lectures are:

"Man and his Environment—Scope, Impact, and Nature," by Dr. Rene Jules Dubos, professor of the Rockefeller University, New York City, a microbiologist.

"Environmental Improvement—Institutional and Governmental Aspects," by Senator Edmund S. Muskie of Maine.

"Control of Environment—Economic and Technological Prospects," by John T. Middleton, Director of the University of California's Statewide Air Pollution Research Center.

"The Future of Environmental Improvement," by Dr. S. Dillon Ripley, Secretary of the Smithsonian Institution.—B.O.

Mission in the American Outdoors. EDITED BY E. W. MUELLER AND GILES C. EKOLA. *1966. Concordia Publ. House, St. Louis, Mo. 165 pp. $4.95.*

Fourteen papers from the 1964 Seminar on Outdoor Recreation sponsored by the National Lutheran Council, Chicago, include 5 by officials of the Department of Agriculture: Alfred E. Edwards, deputy assistant secretary; Lloyd E. Partain, Soil Conservation Serv-

ice; George S. James, Forest Service; and Karl F. Munson and E. J. Niederfrank, Federal Extension Service.

The book is published for the guidance of church leaders concerned with use of leisure time.

Its senior editor, E. W. Mueller, secretary for Church in Town and Country, National Lutheran Council, has been a longtime leader in Soil Stewardship activities sponsored by the National Association of Soil and Water Conservation Districts.—B.O.

New Publications

Natural Resources of Wyoming. *1966. U. S. Dept. Int. 80 pp., illus. $0.65.* The 16th in the Department of the Interior's series of descriptive publications on the resources of the States follows the established format.

The handsome booklet characterizes Wyoming as "mountains and plains alternating" (a translation of its Indian name), at once a frontier land and a modern State.

The physical characteristics and natural resources are described, then the programs of the Federal resource agencies operating in the State are outlined. Besides those of the Department of the Interior, the Forest Service and Soil Conservation Service of the Department of Agriculture and the Army Corps of Engineers are subjects of brief sections.

The Development of a Program for the Salt-Wahoo Watershed in Nebraska. By John Muehlbeier, Otto Thiemann, Howard W. Ottoson, and Lloyd K. Fischer. *1966. Univ. Nebr. SB 490, Lincoln, Nebr. 51 pp., illus.* Settlement of the watershed began in about 1856 and was sporadic until 1859, when the Overland Trail to the West was changed to a more direct route through the area. Flooding along Salt Creek was apparent from the very first. This report describes the problem of the floods along Salt Creek and tributaries and traces the development of soil and water conservation and flood control.

Resistance to Flow in Alluvial Channels. By D. B. Simons and E. V. Richardson. *1966. U. S. Dept. Int. Geol. Surv. Prof. Paper 422-J. 61 pp., illus. $0.50.* Presents concepts that can assist in the development of a better understanding and control of the dominant factors affecting the geomorphology of streams and rivers. These concepts can be utilized in designing stable irrigation canals constructed in alluvium and in determining the discharge that occurred in a natural channel during a runoff event if only residual information is available.

Erosion and Deposition in the Loess-Mantled Great Plains, Medicine Creek Drainage Basin, Nebraska. By James C. Brice. *1966. U. S. Dept. Int. Geol. Surv. Prof. Paper 352-H. pp. 255-339, illus. $0.55.* Differences in runoff and sediment discharge among five subbasins are attributed to differences in relief ratio, adjusted frequency of first-order channels, and percentage of area in upland. Active gullies are attributed to land use since settlement rather than to climatic change. Native vegetation and conservation measures would be effective in the control of the numerous valley-head gullies.

Uses of Airphotos for Rural and Urban Planning. By Jeanne M. Davis. *1966. USDA Agr. Hbk. 315. 39 pp., illus. $0.30.* Airphotos can be used in many ways, such as in preparing land use maps, measuring the size of a lake or a field, selecting a school site, inventorying recreation facilities, and determining change in rate of land use. The author presents in detail information about types of airphotos, uses in planning, photo-interpretation problems in planning, steps in their use for interpretation, availability, and how to obtain aerial photography.

Forester's Guide to Aerial Photo Interpretation. By T. Eugene Avery. *1966. USDA Agr. Hbk. 308. 40 pp., illus. $0.50.* A practical reference that gives information on types of aerial photographs, and how to use them in forest inventory and planning. The booklet gives instructions on obtaining aerial photography, preparing photographs, photo scaling, identifying forest types and tree species, measuring areas, determining tree height, crown diameter, and crown closure, aerial cruising, and photo stratification for ground cruising.

Fluvial Sediment in the Little Arkansas River Basin, Kansas. By C. D. Albert and G. J. Stramel. *1966. U. S. Dept. Int. Geol. Surv. Water-Supply Paper 1798-B. 30 pp., illus., with separate map. $0.60.* Study of characteristics and transport of sediment in water from the river showed that although sediment load varied widely, the water could be used for direct municipal use most of the time. Artificial recharge of ground water using raw turbid water for injection into wells and pits is probably not feasible.

Sedimentation and Chemical Quality of Surface Water in the Heart River Drainage Basin, North Dakota. By M. L. Maderak, *1966. U. S. Dept. Int. Geol. Surv. Water-Supply Paper 1823. 42 pp., illus., with separate map. $0.55.* Construction of Heart Butte Dam in 1949 and Dickinson Dam in 1950 reduced the mean annual streamflow near Mandan about 10 percent and the average annual suspended discharge by nearly half. Quality of the water in the reservoirs normally is suitable for public use.

Sedimentation in Brownell Creek Subwatershed No. 1, Nebraska. By James C. Mundorff. *1966. U. S. Dept. Int. Geol. Surv. Water-Supply Paper 1798-C. 49 pp., illus., with separate map.* Presents results of a sedimentation study which was made as part of a nationwide investigation of the trap efficiency of detention reservoirs. The trap efficiency of the reservoir studied was between 90 and 95 percent.

Fluvial Sediment and Chemical Quality of Water in the Little Blue River Basin, Nebraska and Kansas. By James C. Mundorff and Kidd M. Waddell. *1966. Dept. Int. Geol. Surv. Water-Supply Paper 1819-H. 45 pp., illus. $0.25.* Some of the findings of the water-quality investigations made in 1951–63 at five different sites on the Little Blue River.

Hydraulic Conductivity and Other Physical Characteristics of Some "Wet" Soils in Southwestern Minnesota. By L. F. Hermsmeier. *1966. USDA ARS 41-127. 17 pp., illus.* Compares some of the drainage characteristics of the soils in shallow depressional areas for use in determining tile and surface drainage requirements.

America's Conservation Districts. *1966. Natl. Assoc. Soil and Water Conserv. Dist. (League City, Tex.) 20 pp.* An explanation of how local conservation districts came into being in response to the need for conservation action. The folder describes how the districts work, the conservation plan, community programs and the task ahead.

Chemical Control of Range Weeds. By Chemical Plant Control Subcommittee, Range Seeding Equipment Committee. *1966. U. S. Dept. Agr., and U. S. Dept. Int. 39 pp. $0.30.* Recommended methods by species for woody plants and forbs.

Deep-Tillage Investigations on Alluvial Soil in the Sugarcane Area of Louisiana. By Irwin L. Saveson, Zane F. Lund, and Lester G. Davidson. *1966. USDA ARS 41–123. 21 pp., illus.* Evaluation of the deep-tillage treatment, soil physical properties, soil moisture response, and crop response for crop years 1955-62.

Safe Use of Agricultural and Household Pesticides. *1967. USDA Agr. Hbk. 321. 65 pp., illus. $0.50.* A reference work for farm advisers, county agricultural agents, extension home economists, and others who carry out the educational activities of the U. S. Department of Agriculture.

Handbook of Agricultural Charts 1966. *1966. USDA Agr. Hbk 325. 155 pp., illus. $0.45.* Tables and drawings presenting the situation, production and resources, foreign trade, marketing, population and rural development, the family, and commodity trends.

USDA Helps Expand Outdoor Recreation for Fun and Profit. *1966. USDA PA 780. 16 pp., illus.* Superseding "Accelerating Rural Outdoor Recreation on Public and Private Lands," pictorializes and gives facts and figures on outdoor recreation.

Physiographic Divisions of Alaska. By Clyde Wahrhaftig. *1965. U. S. Dept. Int. Geol. Surv. Prof. Paper 482. 52 pp., illus., with separate maps in folder.* A classification and brief description with a discussion of high-latitude physiographic processes.

Probability Concepts in Geomorphology. By A. E. Scheidegger and W. B. Langbein. *1966. U. S. Dept. Int. Geol. Surv. Prof. Paper 500-C. 14 pp., illus. $0.20.* A theoretical discussion of processes that give landscape its form.

Skiing the National Forests—America's Playgrounds. *Rev. 1966. USDA PA 525. 24 pp., illus. $0.30.* This beautifully illustrated booklet, partly in color, lists the ski areas located in the National Forests.

The Agricultural Research Center. *1966. USDA Agr. Inf. Bul. 189. 37 pp., illus. $0.30.* Lists and describes the divisions and activities in the USDA's research center.

A Bibliography on Marketing Woody Plants and Related Nursery Products 1944–65. Compiled by Jules V. Powell and Dorothy M. Lundquist. *1966. USDA Misc. Pub. 1039. 23 pp. $0.20.*

Grass . . . the Rancher's Crop. By J. S. McCorkle. *Rev. 1967. USDA Leaflet 346. 8 pp., illus. $0.10.* Gives information on the role of grass as soil builders.

The Role of Local Government in Economic Development of Rural Areas. *1966. USDA Agr. Econ. Rpt. 94. 20 pp.* Gives research needs and opportunities.

The Interior of the Earth. By Eugene C. Robertson. *1966. U. S. Dept. Int. Geol. Surv. Circ. 532. 10 pp., illus.* An elementary description of the crust, mantle, and core.

Land-Capability Classification. By A. A. Klingebiel and P. H. Montgomery. *Reprinted 1966. USDA Agr. Hbk. 210. 21 pp. $0.15.*

Soil Conservation Service: What It Is and What It Does. *Rev. 1967. USDA SCS–CA–9. 19 pp.*

Soil Surveys

Jefferson County, Kentucky. By William H. Zimmerman. *1966. 137 pp., illus.; maps 4 inches to the mile (1:15,840).* Field survey by James C. Ross, J. P. Fehr, B. L. Wilson, W. H. Zimmerman, D. T. Carroll, and C. D. Luttrell.

Powers County, Colorado. By James P. Pannell, Roy J. Larsen, M. Bruce McCullough, Ronald E. Moreland, and Stanley O. Woodyard. *1966. 147 pp., illus.; maps 4 inches to the mile (1:15,840).*

Metcalfe County, Kentucky. By Earl E. Latham and Arlin J. Barton. *1967. 82 pp., illus.; maps 4 inches to the mile (1:15,840).* Soils surveyed by Earle E. Latham, Arlin J. Barton, Donald S. Henry, and Ronald D. Froedge.

Tolland County, Connecticut. By Lewis W. Ilgen, Allen W. Benton, Kenneth C. Stevens, Jr., Arthur E. Shearin, and David E. Hill. *1966. 114 pp., illus.; maps 4 inches to the mile (1:15,840).*

Codington County, South Dakota. By Toivo J. Ollila, Lorenz M. Fox, Laurence L. Kobriger, and Dean R. Purrington. *1966. 67 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Judith Basin Area, Montana. By E. K. Hogan, J. L. Parker, Van K. Haderlie, R. C. McConnell, and W. W. Janssen. *1967. 155 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

AMERICA THE BEAUTIFUL COLOR LITHOGRAPHS

America The Beautiful—Washington USDA, SOIL CONSERVATION SERVICE

IRRIGATION WATER KEEPS THE WEST ALIVE, KITTITAS COUNTY SOIL AND WATER CONSERVATION DISTRICT

Full-color lithograph prints suitable for framing—one for each State, Puerto Rico, and the Virgin Islands—are available from the Superintendent of Documents for 10 cents each or $5.00 for set of 52. Obtain order blanks from your local SCS office or post office.

From the Administrator:

The Challenge of Stewardship

EACH OF US is a steward of the land. Each owes a debt to Providence for the riches of nature which have been bestowed upon our Nation.

Our stewardship is the mark of our gratitude. And if we are good stewards we are repaid, again and again, by prosperous towns and a flourishing countryside.

Responsible stewardship requires strengthening the town and country relationship through better understanding, cooperative resource development programs, and needed technical and financial assistance.

It challenges us to so enhance the quality of the environment in this Nation that future generations will enjoy a healthier and more prosperous way of life than we know today.

Good stewardship must assure, within the limits of our abilities, the return to the people the natural bounties that have been denied them through waste and neglect.

The active support of every American is needed to realize this promise.

Let us begin with youth.

Let parents make it a prime funtion of the home to teach their children the worth of the land and the streams and the importance of respecting them always as the lasting basis of life and prosperity and well-being.

Let schools make resource conservation a part of their academic responsibilities — not as a single prescribed course but in the overall assignment of our educational system to describe and explain what America is and what it means, what has been done, and what needs to to be done to preserve our country's values and enhance its benefits.

Let private organizations strive to inform the public of every citizen's responsibility to do all within his ability to protect and enrich the land and water heritage and to offer such assistance as is possible to attract public support.

Let city and town governments accord resource conservation the same concern they give fire and police protection, street maintenance, schools, libraries, hospitals, and the other concerns of community life. Then municipal and county codes and ordinances will reflect the urgent need to plan wisely, build soundly, and protect diligently the land and water resources upon which the community depends.

Let State governments recognize their full responsibility to fight erosion and stream pollution in their own public service activities, and by statute require compliance by others, in the public interest.

A closer partnership of local, State, and Federal agencies and organizations should develop that would permit more effective action to assure sound resource conservation and development in every region of every State.

The need for adequate resource management is greater today than at any time in the past.

Not only is our population increasing, but our more affluent society continues to require more of the benefits that only nature can provide.

These added uses of our resources have multiplied their waste and destruction. The land has been ill-used. The streams have been polluted on an increasing scale as the Nation has become more prosperous.

At a time when we can best afford to exercise caution in the use of our basic natural resources, we have squandered them.

We are losing the equivalent of 400,000 acres of good land a year from erosion and other forms of soil deterioration.

More than a billion dollars a year in flood damages still occur in the Nation's upstream watersheds.

Sediment damage in upstream areas costs an estimated $87½ million a year—most of which could be prevented by small watershed projects.

We can prevent waste. We can protect the land and waters against heedless destruction. We can apply sound thinking and practice selectivity in using soils to assure that our soil and water resources will serve to their fullest the expanding needs of our society.

By proper planning, we can locate the necessary highways, airports, and urban developments without sacrificing—as we so often do now—too much of the Nation's best tillable soil that *will* be needed to meet the future heavy demands upon our agricultural potential.

As always, we are depending heavily on local conservation districts to accomplish more with the resources we have. And we are relying on stronger local and State support of this mutually beneficial effort.

Coordinated resource planning—planning that maps the *total* setting of American life in the crucial decades just ahead—is the key to sound national growth and prosperity. Such planning can provide the incentive and the means to move forward. It can assure the kind of America that we look forward to developing in the remaining years of the 20th Century.

This is the burden of our stewardship of that three-quarters of the land in the care of private hands. In the quality and dedication of this stewardship rests the destiny of a Nation. The challenge is no less than that.

—D. A. Williams

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Boy Scouts Learn Conservation Methods

SINCE 1950, the Central Wasco Soil and Water Conservation District, Oreg., has cooperated with the Boy Scouts of America, Government agencies, private industry, and local people in providing a planned outdoor training program for Boy Scouts at Camp Baldwin, on the eastern slopes of Mt. Hood.

Ron Sumner, camp director, believes that in 1 week's camping experience, a Scout receives more training, has more opportunity to learn leadership, and receives more instruction in scouting methods than in a year of weekly meetings.

The camp is on the site of an early logging camp and mill, surrounded by more than 600 acres of mountainous timberland rich in various kinds of trees and wildlife.

Camp Baldwin provides an excellent opportunity for boys who are working toward soil and water conservation merit badges. Special conservation days provide an opportunity for boys to work on projects.

Within the camp area, the boys can get experience in soil and water conservation, woodland and wildlife conservation, rifle marksmanship, archery, riding, campcraft, nature studies, and other outdoor activities. Campfires are held in the evenings. An outdoor area provides space for church services.

The manmade lake at Camp Baldwin is a center of learning and recreation.

A Scouters' Weekend is held each year, when families of the Scouts take part in cleaning trails, camping areas, outdoor classrooms, and in preparing the area for the summer. In recent years, nearly 500 persons have participated in these events. This acquaints parents and local scout leaders with the many activities of the camp.

A popular feature of Camp Baldwin is its new 6-acre lake, which the boys use for boating, canoeing, or swimming. Assistance from the Soil Conservation Service through the Central Wasco District helped make the lake a reality.—GEORGE L. GREEN, *Soil Scientist, SCS, The Dalles, Oreg.* ♦

1.6 SO3S

Bulletin

JUNE 1967
VOL. 32 NO. 11

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Soil Conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE

Arable Soils . . . .

The prospect of doubled population in another generation has leaders honestly concerned whether soils are adequate to grow enough food.

Such information, of course, is hard to come by for many parts of the world. Any answer must contain a large element of estimation and judgment, and expert opinions understandably differ.

Our own Deputy Administrator Charles E. Kellogg has access to what we believe is the world's best collection of soil maps. His evaluation of the situation (p. 243), although no cause for complacency, is reassuring.

Plants: Efficient plants for improving soils and stabilizing and beautifying the landscape are needed to match soil resources for successful conservation results.

The teamwork between SCS technical efforts and commercial production in providing new and better plants is exemplified in reports from our plant materials specialists on grasses for the Great Plains (p. 246), a real conservation nursery (p. 245), and cover for Atlantic dunes (p. 248).

Suburbia: The importance attached to making soil and water information available to urban and suburban builders is indicated in the Administrator's comments (p. 263) on the upcoming Conference on Soil, Water, and Suburbia.

We will have further reports on this significant forum for land users.

COVER: A selected variety of sideoats grama, a native grass of the Great Plains, is grown for seed on a farm in Lamb County Soil Conservation District, Tex.

Soil Conservation

Devoted to the wise use of land and water resources

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SOIL CONSERVATION is the official organ of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. The printing of this publication was approved by the Bureau of the Budget July 25, 1963.

ORVILLE L. FREEMAN — Secretary of Agriculture
JOHN A. BAKER — Assistant Secretary of Agriculture
DONALD A. WILLIAMS — Administrator, Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service, U. S. Department of Agriculture, Washington, D. C. 20250

BEN O. OSBORN, Editor — GEORGIE A. KELLER, Production Editor

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Subscription: $2.00 per year, $2.75 foreign. Single copy, 20 cents. Discount of 25 percent on orders of 100 or more sent to same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D. C. 20402.

World Potentials of Arable Soils

By Charles E. Kellogg
Deputy Administrator for Soil Survey

ALL WHO READ are aware of both present and potential food shortages in several parts of the world.

Many ask, "Are we running out of land? Is it possible to increase food production to meet the needs of the world's population?"

The World Soil Geography Unit in the Soil Survey, SCS, has been studying the soils of the world for many years. Draft soil maps have been made of most of the world at scales of 1:1,000,000 (about 16 miles to the inch) or larger. For some countries we have more reliable data than for others. The mass of data grows day by day.

The data show clearly that the world has the soil resources to more than double the present area of arable soil. That is, we have the physical and biological potential for enormously more food.

As our data have increased over the years, so have our estimates of potentially arable soils increased. Now we estimate for the world about 7.8 billion acres of potential arable soils, of which about 3.4 billion are cultivated and about 4.4 billion are not yet cultivated. Most of these acres are well or moderately well watered.

We are confident that the figure of 4.4 billion acres of potential new arable soils is a conservative one. As agricultural science goes forward, its effect is not only to increase yields per acre, and per man-day-acre, but also to find combinations of practices for using soils that are unproductive with primitive methods.

The largest areas of potential arable soils not now used for cropping are in Africa, especially south of the Sahara. Africa now cultivates about 309 million acres out of a potential of 1,810 million acres. The basin of the great Congo River system alone has enormous physical and biological potentials for farm production.

The next largest area is in South America, especially east of the Andes Mountains and near the Atlantic seaports. Of the estimated 1,600 million acres of potential arable soil, about 190 million are cultivated.

North America and South America together could increase arable soils by about 660 million acres or a bit more. Nearly one-third of this could be in the United States.

Although parts of Asia are al-

Soil surveys, in foreign countries as well as in the United States, are identifying the soil suitable for cultivation. Here an SCS soil scientist and a landowner appraise an irrigated valley in the West.

ready crowded, mainland China especially, the area of cultivated land could be increased by about 207 million acres, not counting the Soviet Union. Much of this is in the southeastern countries, such as Burma, Laos, Cambodia, Thailand, and Malaysia. For the whole of the Soviet Union, an increase of 270 million acres is possible.

Europe, not counting the Soviet Union, is already quite crowded but still has a potential of about 50 million additional acres.

To some people the total figure of 4.4 billion potential acres of new cropland may seem high. It would be very large by the technology of 40 or 50 years ago. Yet it will seem very conservative to the soil scientist of the year 2000 with all the new technology farmers will have to serve them by that time.

Increasing the area of arable soils is only one of the ways that food production can be increased. Another is to increase the yields from the soils that are cultivated.

The yields of crops could be increased five- to tenfold in many areas through better management with modern technology. Advanced countries of temperate regions have long backgrounds of successful agricultural research. This has led to highly efficient technology for soil use.

Only a little such research has been done in the Tropics. The people who live there desperately need better technology adapted to their use on their soils. Not much of our technology in the United States can be transferred to the unlike soils and social systems of the Tropics, although a part of it can be, and another part can be adapted. But the scientific principles and research methods can be transferred. The soils of the Tropics are not at fault; we have only to learn how to use them.

A third way to increase the available food supply would be through improved methods of food processing and storage to reduce the enormous wastes that now occur in many countries. Much of the crops now harvested is lost in storage and transport—ruined by rodents, insects, fungi, and bacteria.

Many cultivators and farm villages lack adequate warehouses. They lack adequate facilities for processing perishable materials by freezing or canning. Lack of refrigeration sharply limits livestock production in the tropical and subtropical areas. This is true even on the margins of many rivers with enormous potential for hydroelectric power.

Then too, farmers need machines, fertilizers, and other services in order to develop new arable soils and to increase their yields. Most of us take such services for granted, partly because they are mostly in the private sectors of economy. But in many areas of high potential for farming in other countries, they do not exist.

Agricultural development, economic development, and good living standards are inseparable. One cannot be had without the others. The words "farming" and "agriculture" are no longer practical synonyms, as they once were.

In any country with a modern agricultural system, far more people work off the farm than on the farm. In the United States only about one-fifth of the people employed in agriculture work on farms. A part of the others supply farmers with chemicals, machines, oil, electric power, and many other services for production on farms. Others process, transport, store, and market farm products.

All advanced countries got their start toward economic development out of agriculture. Then as industry developed, it in turn helped agriculture. It helped farming by supplying chemicals and machines, and it made food processing, storage, and transport far more efficient.

Locally, other industries within farming areas help share the costs of transport, education, and other services. There are few, if any, successful farming areas in the world where farmers pay all the costs for these services by themselves.

The most efficient farming in the world today is on suitable soils near harbors or other transport where people also have access to education and services. Equally responsive soils not so favorably located have gone undeveloped. Successful settlement of these new areas will require the development of resources for other purposes besides farming.

A great many factors contribute to the current problems of agricultural and economic development around the world. Solutions are made more difficult by sharply declining death rates, deficiencies in education and research, inexperience in national government, inadequate funds for investment, and the like. Among the essential steps to be taken, perhaps institutional building for agricultural and economic development, in both the public and private sectors, is the most critical and the most difficult.

In any country's program for a more abundant and effective agricultural system, many choices have to be made. Some need to put major effort on improving farming on the soils already in use. Others need to put emphasis also on the development of new farming areas where the soils are responsive and resources are available for associated economic enterprises to share the cost of transport, education, and health services.

Both public and private institutions must be strengthened and developed for research, for making machines and chemicals, and for handling the products.

The choices among alternatives and priorities for action will vary widely in different countries as development of the several sectors of agriculture and of the general economy move forward. ♦

Black Angus cattle graze heavy fescue pasture in February. They are not fed hay, yet find adequate feed.

Nurseryman Prefers Hills

Intensive grassland farming keeps slopes safe and productive for nursery use

By B. H. Rountree and C. E. Mowry
Plant Materials Specialist and Center Manager, SCS, Elsberry, Mo.

WHY would anyone pick hill land for a nursery farm?

Hugh Steavenson, owner and manager of Forrest Keeling Nursery, Elsberry, Mo., did because he knows how to control erosion, build soil tilth and fertility, and how to conserve, manage, and collect rainfall for irrigation.

He preferred to locate his 500-acre nursery farm on hills overlooking the Mississippi River in northeastern Missouri where the loessal soil mantle is excellent for horticultural production but steep grades make protective measures imperative.

The nursery is located adjacent to the Soil Conservation Service Plant Materials Center in Elsberry, making it convenient for SCS technicians, working through the Lincoln County Soil and Water Conservation District, to help Steavenson develop a complete conservation program.

Before any field is opened for nursery production at Forrest Keeling Nursery, it is graded or "landplaned" to create a more uniform slope. It is then terraced to slow and manage runoff and to provide guidelines for contour tillage. Master terraces are arranged to gather water from the nursery farm and capture runoff from farms above the nursery. This runoff is stored in some dozen deep ponds and a small lake for an irrigation supply.

Soil tests are made to indicate amounts of lime, rock phosphate, and fertilizers needed for smooth brome and alfalfa, or other grass-legume combinations. Minor elements are rarely needed. Occasionally a magnesium deficiency is corrected with dolomitic limestone, or a pinch of boron is needed for best growth of alfalfa.

The grass-legume combination is fertilized twice annually and maintained for at least 3 years. To return maximum organic matter to the soil, meadows are grazed by the nursery's herd of black Angus cattle. Meadows are also mowed regularly, and all clippings returned to the soil. These fields, while in grass, carry a cow and calf per acre, which yields an excellent return aside from the soil buildup.

Preparing the ground for nursery production starts several months prior to planting by plowing the sod to allow some breakdown of the massive grass-root system. A green-manure catch crop of corn, rye, or field brome may be raised and plowed down during this period. All such plowdown crops are liberally fertilized to assure a balanced, high nutrient level for the nursery crop to follow.

The ground is now ready for seedbeds, transplant beds, or field rows. All such plantings are made on the contour between terraces.

Field brome is planted between contour rows of nursery stock (left) to give winter cover. An SCS-developed strain of autumn olive (right) catches snow between contour rows.

A mulch of sawdust is maintained on seedbeds and transplant beds. This mulch further reduces erosion and, at the same time, maintains or increases soil organic matter level and friability. The nursery has used sawdust copiously for the past 17 years, and now uses it at the rate of 5,000 cubic yards per year. No injury to any variety of plant has been observed when the sawdust is balanced with a high nitrogen fertilizer.

In addition to seedlings, transplants, and smaller size balled and bagged plants, all grown under the mulch system, the nursery raises specimen (caliper) trees in 12-foot contour rows. After two seasons of tillage, with an intervening winter cover of annual field brome, these rows are seeded to a permanent turf until harvested. Under sod, little if any erosion occurs.

For 10 years, Steavenson leased river bottom land because of the ready availability of irrigation water.

"Since the development of our terrace and pond system, we now have all our production back in the hills. Air and soil drainage is much better. Everything grows as well, if not better, and harvesting (digging) is far easier in the hills," Steavenson states. ♦

Seed Business Plays Key Role in Conservation on Great Plains

By H. Ray Brown and Robert D. Lippert
Range Conservationist and Plant Materials Specialist, SCS, Salina and Manhattan, Kans.

A KANSAS seedsman-farmer who saw the swelling need for high-quality grass seed in the Great Plains in the late 1950's and moved to meet the demand has built, with his sons, a thriving business and played a key role in the revegetation of eroding cropland.

M. B. Sharp of Healy, Kans., had been in the seed business since 1908 and with the help of his sons, Gerald and Gail, was also farming and ranching.

As Great Plains landowners sought to take part in the new Conservation Reserve Program—to convert low-grade cropland to soil-conserving cover, mainly native grasses—they swamped Sharp and other seedsmen with calls for grass seed and information on methods of planting.

A natural harvest

In 1958, Gerald and Gail established the Sharp Brothers Seed Company and undertook to harvest seed from natural grasslands throughout the Great Plains.

The Sharps tried buying seed from other growers as it was needed. They traded seed, tried contract production, and bought on consignment in an effort to supplement their uncertain harvests from natural grasslands. There was also a need for specially designed equipment for seeding, harvesting, and cleaning seed.

The Sharp Brothers were soon convinced that if they were to have dependable supplies of needed varieties and strains of grass seed, they must grow them themselves under irrigation.

They gathered information on potential seed needs from the Soil Conservation Service and the Agricultural Stabilization and Conservation Service.

Technical assistance

As cooperators with the Lane County Soil and Water Conservation District, they obtained SCS assistance in selecting fields with suitable soils near a dependable source of water and in planning

the necessary conservation practices. SCS plant materials specialists advised them on seed production methods and suitable sources of seed for planting.

They leveled the land where necessary to provide water control by furrow irrigation. Grasses were planted in 40-inch rows to make irrigation and cultivation easier.

The Sharps concentrated their efforts on improved varieties of the grasses most urgently needed in their market area. They found that, through their soil conservation district, they could get foundation seed of improved varieties developed at SCS plant materials centers at Manhattan, Kans., and elsewhere.

Producing grass seed is not easy. It requires intensive treatment—fertilization, cultivation, and chemical weed control. Pre-emergence herbicides in combination with cultivation and hand weeding all are necessary to produce grass seed that meets State and Federal seed laws. Timely operations using specially adjusted equipment for harvest and seed cleaning are essential.

On former wheatland

Sharp Brothers Seed Company was able to establish about 300 acres of improved strains of native grasses for seed production within 2 years. They also arranged for production of about 200 acres of grass seed by other farmers in western Kansas and other places in the Great Plains. All of it is on land formerly growing wheat and grain sorghum.

As of September 30, 1966, the 62 Great Plains counties of Kansas had 801,082 acres of grass in the Conservation Reserve, plus 150,296 acres of grass seeding for which Great Plains Conservation Program payments have been made. The Sharps have provided a significant share of the seed for this grass acreage.

Along with seed production, the Sharps have learned much about growing, harvesting, processing and seeding native grasses. Their modern processing plant is one of a few in the Great Plains especially designed to process native grasses. "We have learned how to improve quality and to save more pure live seed," says Gerald.

Conservation results

But what of the land, landowners, and the Nation benefiting from the increased acreages of grass made possible by the increased seed supply?

A common rotation in western Kansas before the cropland retirement program was sorghum-fallow-wheat. Under the Conservation Reserve, many of these farmers have converted one-third of their acreage to permanent native grass. The remainder was alternated between crop and fallow.

As the demand for grass seed for the Conservation Reserve waned, new demand for seed was generated by the Great Plains Conservation Program and by new and expanded conservation uses.

It is estimated that more than half of the grassland acreages of the 5- and 10-year Conservation Reserve contracts in western Kansas have remained in grass and are now being grazed. Nearly all land less suitable for cropland has stayed in grass.

The real benefits from native grass seed production and additional acres of cropland converted to grass are many and far-reaching. Water runoff, silting, flood hazards, and wind erosion have been reduced. The additional acreage of grass has helped to stabilize range livestock production. Soil along highway rights-of-way is held in place.

In addition, grass seedings have benefited recreational and wildlife areas. Prairie chickens and other upland game birds are on the increase. More recently, the national land beautification movement has benefited from the fact that native grass seed is readily available.

"Many manmade problems can be reduced, corrected, or controlled by maximum use of natural vegetation, especially grasses," according to Gerald Sharp. He and Gail are proud to have an important role in achieving the goal of good land use and resource conservation. ♦

Gerald Sharp (right) and his foreman, Bill Davis, check readiness of bluebunch wheatgrass for harvesting on a ranch in the Madison County Soil Conservation District in Montana.

Pioneer Beachgrass Nursery Helps Cover Atlantic Coast Sand Dunes

By Virgil B. Hawk
Manager, Cape May Plant Materials Center, SCS, Cape May, N. J.

THE STORM that wrecked the Mid-Atlantic Coast in March 1962 has greatly encouraged shore property owners to batten down their sand dunes with beachgrass.

Frank Church, cooperator with New Jersey's Cape-Atlantic Soil Conservation District and winner of the 1966 Conservation Farmer Award, helps meet a critical need by producing planting stock of American beachgrass.

The technical help of the late Ed Evaul, New Jersey State soil conservationist, and Bill Steiner, regional plant materials specialist, ushered Mr. Church into the beachgrass business on Armistice Day 1962. With a background of 40 years in the nursery trade, he made a success of this new, unique business.

The enterprise started with 10,000 seedlings of American beachgrass furnished to Church's nursery by the Cape-Atlantic District from the SCS National Plant Materials Center. Bob Thornton, center manager, had grown the plants with seed collected on the dunes at Lewes, Del.

Following the original planting of 1 acre in 1962, an additional one-half acre was established by direct seeding in the late spring of 1963. Thereafter, the production fields were established by vegetative planting of single culms in the fall. At present, the area totals 4 acres.

Originally, it was thought that established nursery fields would yield annually for 5 years or more without renovation or replanting, by leaving one-fourth or one-third of the field undug or unharvested for regeneration. Rapid spreading of the beachgrass and development of a sod made this system unworkable.

The best method is the establishment of a new production field each fall. A year later a hundredfold increase is ready for harvest.

The planting stock is lifted with a modified potato digger or sometimes a U-blade digger. Stock is stripped, cleaned, graded, and tied in bundles of 300 culms, guaranteed minimum. Rapid delivery is accomplished by covered truck to provide viable, vigorous planting stock.

The late Ed Evaul, New Jersey State soil conservationist (left), advises with father and son Frank and David Church about beachgrass production in their nursery.

In February 1964 the first commercial lot of American beachgrass planting stock was sold. About one-half million 3-culm plants were sold in 1964. Sales increased to three-fourths million in 1965 and 1 million in 1966. Expected sales in 1967 are 2 million.

Most of the sales have been to contractors who were planting beachgrass for the Army Engineers, State Highway Departments, State and National Parks, municipalities, and individual property owners. A few sales have been made direct to "Greendike Clubs," local groups who band together to save their property from erosion.

American beachgrass stock production, a family affair with sons David and Frank, Jr., has extended much beyond New Jersey. Many sales have been made in Massachusetts, Connecticut, New York, Delaware, Maryland, and Virginia. With only three other commercial nurseries in the business, there is room for expansion by others willing to follow Frank Church, conservation farmer and pioneer beachgrass grower. ♦

American beachgrass (background) and dune panicgrass (foreground) are extensively planted to stabilize Atlantic ocean-front dunes.

Progress in Pri-Ru-Ta

Water control, recreation facilities, forestry, and soil conservation bolster local economy

By A. William Jipson and Richard Lindberg
RC&D Project Coordinator, SCS, and District Forester, Wisconsin Conservation Department, Park Falls, Wis.

LOCAL PEOPLE, with help from State and USDA agencies, are breathing new life into a three-county area of northwest Wisconsin.

Soil and water conservation districts have taken the lead in establishing the Headwaters Pri-Ru-Ta Resource Conservation and Development Project, and measures to solve problems have already been installed.

The name sounds like some kind of new vegetable or a race track, but it isn't. It comes from the first letters of the names of the three soil and water conservation districts involved—Price, Rusk, and Taylor. The word "headwaters" simply signifies that the area lies across the upstream reaches of some of Wisconsin's principal streams. What happens here affects a lot of land and people downstream.

A complex of problems

Several related problems perplexed supervisors of the three conservation districts when they applied in 1964 for assistance in planning the development of the area's resources.

Three-fourths of the labor force is employed in agriculture, and three-fourths of the gross farm income is from livestock and livestock products. But small-sized farms with too little cropland limited full use of labor and management.

Thousands of acres are damaged by erosion, but other thousands have too much water on the surface. The area has thousands of acres of woodlands, but limited outlets for timber products; wilderness areas with recreation potential, but too few facilities; lakes, but no dependable supply of usable water.

Rusk Soil and Water Conservation District Chairman Don Solsrud, a dairy farmer and town chairman, heads the project executive committee which initiated the action. Serving with him are Supervisors Gordon Dahlie and Carl Sunseson of the Price District; Francis Zenner and Forrest Taylor of Taylor; and Marvin Nelson of Rusk.

"Our basic purpose is to improve the economy of this area by conserving and developing its resources," says Solsrud. "We have already made good progress in accomplishing this."

Some problems have already been virtually solved. Teamwork between local citizens and representatives of the Soil Conservation Service, Farmers Home Administration, Agricultural Stabilization and Conservation Service, and Forest Service, allied with Wisconsin's Conservation Department and Cooperative Extension Service, has resulted in many project measures installed, others underway, and still more planned.

For example, a new water-control structure made of steel fused with glass now holds Rib Lake's water level up to stabilized heights. An old sawmill dam built half a century ago just wasn't sufficient. Taylor County commissioners appropriated the money, SCS engineers designed the structure, and the job is done. Also included is a diversion channel to reroute sewage effluent and a dike to hold back overflow from a nearby stream.

The village of Rib Lake has bought a new weed harvesting machine to keep the water free of that menace. They have been granted Land and Water Conservation funds to build new recreation facilities planned with SCS technical assistance.

This single project measure will add about $5,000 a year additional income for six people.

The executive committee of the Pri-Ru-Ta Project includes (left to right in back row) Francis Zenner and Carl Suneson and (front) Forrest Taylor, Don Solsrud, and Marvin Nelson.

An intensive inventory has been completed on some 190,000 acres of county-owned forest lands in the three districts. Foresters of the Wisconsin Conservation Department have recorded present stands, future growth predictions, recreation potentials, and other information, compartment by compartment, on cards for electronic data processing. Machines can tell you in a wink a lot of facts that can be interpreted into jobs, board feet, acreage incomes, or supplies of woodland raw materials.

An important part of Pri-Ru-Ta's economy lies in its forest industries. Surveys have been completed by experts to provide these industries with sound data for planning future expansion. The surveys also pointed to the need for additional secondary wood-using industries capable of producing the finished product. Industrial expansion along these lines has already become a reality.

There is progress in soil and water conservation work, too. Groups of district cooperators in the Grow and Dewey townships of Rusk County, with help of ASCS and SCS, have installed 12 miles of new water-management channels, making good agricultural land more usable. It will be used for the production of forage for dairy cows. These soils had the twin problems of too much erosion and too much water. When completed, the job will serve approximately 250 farms with more than 50 miles of new channel.

"The work has already encouraged several good farmers to remain and improve their farms," said Don Solsrud. "We are working hard to promote more measures to keep people from deserting the land," he added.

County Agent Norman Kahl and SCS Work Unit Conservationist Bob Dawson met with these groups and explained the proposal. SCS engineers put the surveys on the land, and contractors did the work.

A nonprofit organization sponsored by the Rusk Conservation District has purchased five new land-leveling machines, the first in these parts, to finish the job on land adjacent to the channels.

Rusk County ASCS Committee extended cost-sharing to the landowners, and FHA made soil and water conservation loans where needed. This is the kind of agency teamwork that gets a job done.

"We need more cows and more milk in this area, and Pri-Ru-Ta is on the way toward getting it done," says Clarence Gustafson, manager of dairy processing plants at Ladysmith and Rice Lake.

To further solve problems in dairying, FHA is making land ownership loans to selected dairymen to buy additional land. This will let them expand their operations to more economical size. About 25 have been helped in this way so far, and many more are in need.

This measure solves another problem. It takes land now lying idle and puts it into a good land use and soil and water conservation program which reduces erosion, helps broaden the tax base, increases business in town, and a lot of other good things.

Maple sirup has come out of this area for many years, but there is room for about a thousand percent increase to meet demands. Price County Agent Milo Johansen has helped folks in his area set up three new processing plants, and plans are to get enough plants going to supply 20,000 gallons a year for America's pancakes.

About 1890, old Miller Dam in the Taylor Conservation District was built to catch water for pushing logs down the Chippewa River. But there has been a lot of water over the dam since then, and the lake is about dry.

New Miller Dam is now completed, creating a 2,700-acre lake and a new source of recreation in

Water-control structures are an important feature of agricultural and recreational development in the Pri-Ru-Ta area. The dam at Lake Laverne (left), constructed under an ACP pooling agreement, will form a 100-acre lake. A drop spillway prefabricated of glazed sheet steel (right) maintains a minimum water level in Rib Lake.

Pri-Ru-Ta. Most of the lake is in the Chequamegon National Forest where the Forest Service is already designing picnic and camping areas along the shore. Some 700 acres in the south end will be set aside for a waterfowl refuge.

You will be able to find all these recreation facilities if you stop and ask at the new Rusk County Information Center in Ladysmith. A joint venture between the Rusk County Tourist Promotion Committee and the Rusk Committee on Aging, it employs elderly people as attendants. Both city and county appropriated funds for it. A sideline is the handicraft on sale in the lobby, produced by citizens who may be aged but not idle.

Flood prevention, water stabilization, and recreation are the three main benefits expected from the new structure at Amacoy Lake now under construction with some assistance from RC&D funds. It will keep floodwater from the Chippewa River out, but hold lake levels up. Where once the lake was alternately flooded or dry, the new structure allows a maximum fluctuation of 3.2 feet, according to SCS engineers who designed it.

And more to come

Project measures in the planning stage in Pri-Ru-Ta create about as much enthusiasm as those already done.

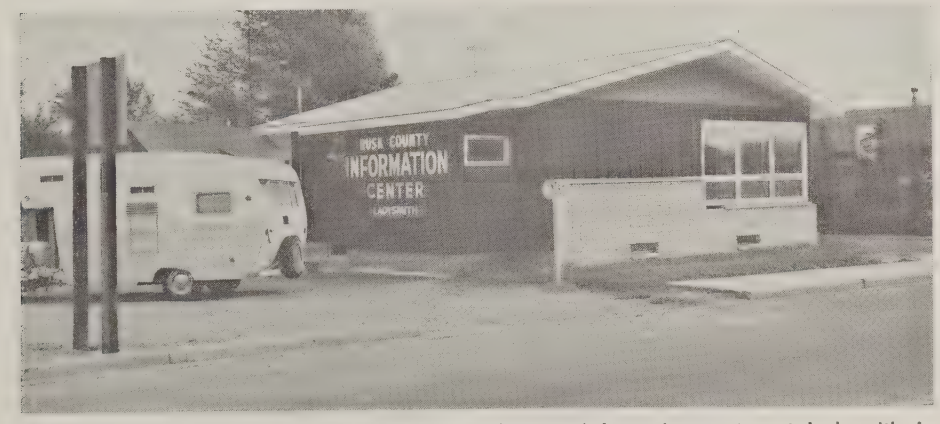
The North Central Canoe Trails along the picturesque Chippewa, Flambeau, Jump, and Thornapple rivers will offer 350 miles of scenic adventure. It is to be a private, nonprofit operation, and maps furnished by SCS have been incorporated into a beautiful 28-page guidebook for canoeists.

The Mt. Atlanta Recreation Area will feature a ski slope, golf course, swimming pool, chalet, and hiking and riding trails into the Blue Hills primitive area. Here again private enterprise springs into action with planning and survey help from RC&D.

Ray Suess, district manager of Lake Superior Power Company's Ladysmith office and secretary of the Ladysmith Industrial Development Committee, sums up Pri-Ru-Ta this way: "Anything that promotes progress in industry, agriculture, and recreation is what we are looking for." That is the name of the RC&D game.

What going concern couldn't support 83 separate project measures clearly designed to create an estimated 243 new jobs for people and bring in a calculated new income of $1,976,000 a year? The frosting on the cake is the accelerated land treatment for a more stable economy, worth another 150 jobs and bringing the total income increase to about $3 million. And the project is open ended to embrace any new proposal which will help reach the objectives it is designed for.

They're off and running at Pri-Ru-Ta. ♦



One of the project measures already completed is an information center at Ladysmith in Rusk County.

Soil and Suburbia Conference Draws a Good Response

RESPONSE to invitations to the mid-June conference on Soil, Water, and Suburbia suggests an enthusiasm for which the sponsoring Departments—Agriculture and Housing and Urban Development—had hoped.

The conference, on June 15 and 16 in Jefferson Auditorium in Agriculture's South Building, is designed to provide a forum for public officials, planners, engineers, developers, and the representatives of business and finance to study problems of suburban development and to probe solutions.

More than 100 organizations with a direct interest in land use, development, and management were asked to name participants. Agencies, commissions, and officials dealing with related problems received special invitations.

Speakers, in addition to Secretary of Agriculture Orville L. Freeman and Secretary of Housing and Urban Development Robert C. Weaver, will include Leon N. Weiner, president of the National Association of Home Builders; Dr. Cecil H. Wadleigh, director of soil and water research, Agricultural Research Service; Kurt W. Bauer, executive director of the Southeastern Wisconsin Regional Planning Commission; Byron R. Hanke, chief of the land planning section of the Department of Housing and Urban Development; Charles H. W. Foster, president of the Nature Conservancy; Stuart Finley, a supervisor of the Northern Virginia Soil Conservation District; H. Ralph Taylor, assistant secretary for demonstrations and intergovernmental relations, Department of Housing and Urban Development; and SCS Administrator Donald A. Williams. ♦

Cleaning up the town dump . . . .

Conservationists Take a Hand in Sanitary Waste Disposal

TOWN dumping grounds may never become tourist attractions, exactly, but there's proof that they can be changed into centers of conservation interest.

This has happened in northern Maine where waste-disposal areas concern local sponsors of the St. John-Aroostook Resource Conservation and Development Project. Leaders of more than 30 townships within the project boundaries plan to use modern land and water science in relocating old dumps and locating new ones on suitable soils.

A dozen towns have secured on-site soil, engineering, and plant material information to help insure that future dumping will avoid unsightliness and pollution of water supples. The assistance is a part of broadened aid being offered to town planning bodies by the Soil Conservation Service at Presque Isle, Fort Kent, and Houlton in the RC&D area.

Dump improvement is 1 target of 50 measures designed to protect and capitalize the beauty and economic potential displayed by nearly 3 million acres in U.S.A.'s northernmost farming, timber, and vacation country.

Signs that dumps respond to conservation management are visible at communities such as Allagash, Eagle Lake, Sinclair, Frenchville, and Van Buren—amid scenery long popular with hunters, fishermen, and campers in Upper Aroostook County .

Until recently, a local practice was to dump refuse into sand and gravel pits and on streambanks. The porous soils too readily released contamination affecting nearby streams, lakes, and ground water. Many homes in the project area use driven wells and springs. Health, as well as sport-fishing and scenic values, were endangered.

Taking a fresh approach, SCS soil conservationists have outlined alternative areas of soils more suitable for town dumps. Newer installations are located on recommended loamy soils and on side roads where they do not offend the eye. The loams filter out most of the obnoxious pollutants as waste

Smoking and unscreened dumps that pollute the air and mar the scenery of Maine's summer vacation land are a major concern of the St. John-Aroostook Resource Conservation and Development Project.

water drains slowly through the soils.

Other conservation techniques applied to the modernized dumps include the time-tested practice of contouring. Trenches to receive wastes are dug along contour levels laid out by SCS technicians. Trash materials are later covered by soil borrowed from additional trenching dug at the next contour elevation uphill. The result is a terraced effect making it easier to establish screening and beautification plantings of grass, shrubs, and trees.

Diversion channels and water-spreading devices are installed, as needed, to keep dumps from eroding, flooding, and otherwise threatening community health and safety. Dikes are sometimes built to retain all dump water on site. However, all conservation-assisted disposal areas are now planned so that their drainage should not adversely affect other watershed resources.

Northern Maine, like other attractive rural areas, feels the im-

The threat of pollution of many scenic lakes by water draining from improperly located town dumps initiated a search for more suitable sites. At Eagle Lake, Maine, the old dump (right) was refilled, graded, and seeded to vegetation to put an end to water pollution.

The new dump at Frenchville, Maine, (above) is on a carefully chosen site on suitable soils and screened from the highway. At Eagle Lake (below), trenches are opened along contours to help prevent flooding and erosion on the watershed.

pact of commerce and industry, along with attendant homesite and tourist developments. Waste of all kinds is a growing problem. Costs of disposal creep upwards. Current surveys show good dump soils are often found on good farmland worth up to $200 an acre.

As a Van Buren civic leader described the situation, "We can face the costs; but we couldn't go on facing the puzzle of not knowing what to do next. We're many steps ahead of the game, now. With our dumpsites inventoried we can plan 25—maybe 50—years ahead. That's a lot better than shopping around for a new dump just about every time a town meeting rolled around!" ♦

Irrigation Adds Hay for Ranch

A new irrigation system recently installed on Bare Ranch in the Surprise Valley Soil Conservation District of northeastern California is providing Owner R. R. Rodriguez much-needed hay to balance the yearlong feed requirements on his entire ranch.

Improvement on the ranch's public land grazing allotments had created a need for developing more land in the 17,000 acres of private holdings.

Planning and using grass and water for livestock comes naturally to Rodriguez. He is a sixth generation descendant of Jose Antonio Rodriguez, a Spaniard, who settled in the Monterey-Santa Cruz area of California in the 1780's.

Rodriguez is using the water of Bare Creek, which flows out of the Warner Mountains to the west, to irrigate hay lands which conserve the soil and provide feed for his cattle.

He is doing this with a gravity-powered, wheel-move sprinkler system. As a result, land formerly dry, wind-eroded, and sagebrush-covered has been transformed into lush hay land, which also provides pheasant and quail habitat in a land naturally more hospitable to jack rabbits and ground squirrels.

The system entails water delivery of more than 3,000 gallons a minute through a system of diversions, canals, desilting ponds, structures, and 5 miles of pipeline to the self-propelled sprinkler laterals. Four-hundred and seven sprinkler heads irrigate the 500 acres.

The Soil Conservation Service furnished engineering surveys for the system. They worked with the engineers from Moore's Irrigation Company of Corvallis, Oreg., on the basic design.

Cost-sharing assistance on the applicable conservation practices

was furnished through the Lassen County Agricultural Stabilization and Conservation Committee.

Clarence Gorzell, of Lake City, installed the system. It has 12 wheel-move sprinkler laterals, ranging from 1,280 to 1,620 feet long. Each lateral is capable of irrigating about 4½ acres in 24 hours.

To insure adequate water for dry years, a 4,000 acre-foot reservoir was installed in the upper watershed. This reservoir was constructed with the assistance of the Surprise Valley District. The cost of the project, based on the initial 500 acres of hay land, averages $160 an acre.

"Cost will be easily offset since it guarantees a reliable, high-quality source of feed for my operation.

"The system is operated by an irrigator merely opening or closing a pipeline valve to start or stop the operation. The 12 laterals are moved by individual gasoline motors. Thus, labor costs are low and proper irrigation-water management is easy to achieve," said Rodriguez.—CHARLES N. SAULISBERRY, *River Basin Staff Leader, SCS, Carson City, Nev. (formerly at Cedarville, Calif.)* ♦

Colorado Produces New Grass for Medium Elevation Dry Lands

By S. H. Fuchs
Plant Materials Specialist, SCS, Albuquerque, N. Mex.

LUNA pubescent wheatgrass is a promising newcomer to the farmer's staple of tried, tested, and proved varieties of conservation grasses that have gradually appeared on the market during the last 35 years. Harry Coleman, a seed producer for 18 years, is enthusiastic about the latest addition to his operation.

Luna was released late in 1963 for seed increase in soil conservation districts. The new variety was developed at the Plant Materials Center at Las Lunas, N. Mex., operated cooperatively by the Soil Conservation Service and the New Mexico Agricultural Experiment Station. Mr. Coleman planted 5 acres in the spring of 1964 and another 14 acres in 1966.

"It made about 400 pounds of clean registered seed an acre. Not bad where the average precipitation (much of it snow) is little more than 16 inches. I believe it will make better than 3 tons of hay an acre dry land at my place," Coleman said. "That's three times the average for grass hay in this area."

Coleman's dryland farm is about 10 miles east of Meeker, Colo., in the rolling mountain country of the Douglas Creek Soil Conservation District in northwestern Colorado. Elevation at the farm is about 6,400 feet. Coleman's soil is moderately deep; most of it about 18 inches over rock.

A large part of the 144 acres he has in grass seed production was covered with a thick stand of Gambel oak brush, which he cleared to prepare the land for grass seed production.

Luna does best on deeper soils of the upper big sagebrush and

Harry Coleman (left), certified grass seed producer, grows both Luna pubescent and Amur intermediate wheatgrass. Some of his seed-cleaning equipment is shown at right.

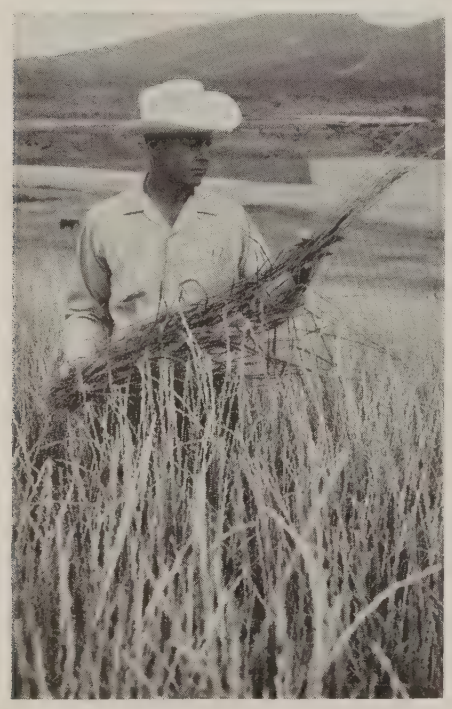
scrub oak zones. It thrives on poor soils better than intermediate wheatgrass. Coleman observes that Luna gets off to an exceptionally vigorous start and produces seed the first year. It produces more foliage and will grow on drier sites than intermediate wheatgrass.

Coleman also has grown certified Amur intermediate wheatgrass seed for 10 years. Amur was released 13 years ago. It is now grown on thousands of acres in the mountains of Colorado and adjacent States where precipitation is 16 inches or more.

Both Amur intermediate and Luna pubescent wheatgrass are adapted for hay and pasture. They are long-lived rhizomatous cool-season grasses. They green up early. This feature makes them valuable to stockmen because they furnish green feed weeks before most of the native grasses do.

Only two Colorado seed growers had Luna pubescent wheatgrass for sale in 1966. Coleman plans to sell all the seed of his original 5 acres as registered seed. ♦

Henry "Pete" Lester uses special equipment provided by the conservation district to plant corn in rye mulch.



This Luna pubescent wheatgrass is 15 months old. Jesse Hale, SCS work unit conservationist, Meeker, admires its growth.

Planting Corn in Rye Mulch Finds Favor With Dairy Farmers

By Sherman F. Gold
Work Unit Conservationist, SCS, Abingdon, Va.

"IF I farmed today like I did 10 years ago I'd be broke," says Henry "Pete" Lester of Washington County, Va.

Ten years ago Pete used a 3-year rotation of corn, small grain, and hay on his sloping, deep limestone cropland. Ten years ago Pete had 25 dairy cows on a 130-acre farm producing 10,000 pounds of milk and 380 pounds of butterfat per cow.

Today Pete has 70 dairy cows on the farm and gets 13,800 pounds of milk and 539 pounds of butterfat per cow.

Why more cows? To pay the increased costs of operating a Grade "A" dairy and have enough net income for a decent standard of living.

How did he supply the increased feed needs? He changed his crop rotation to include more corn for silage and less hay and pasture.

Pete's case is just one among many with the same story. Unfortunately, too many farmers in this Virginia highland country have increased their corn acreages on sloping land with too little regard for the hazards of soil erosion.

Four years ago the Holston River Soil and Water Conservation District became aware of the dangerous trend. The board of supervisors decided to work with farmers in solving the problem rather than to say, "Thou shalt not plant thy steep slopes in corn."

The supervisors learned of research at the Virginia State Experiment Station at Blacksburg on a method of planting corn in sod that had been treated with atrazine before corn planting time.

The researchers didn't have all the answers, but the supervisors and I (the SCS conservationist serving the district) decided the Blacksburg method was worth trying on a few farms.

The lack of special equipment for planting in sod was a major obstacle. The district purchased a used two-row corn planter at a farm auction. One of the supervisors, G. C. Johnson, who is a master mechanic as well as a farmer, went to work at nights, with my help, in his farm shop. When we had a workable planter, it was made available to district cooperators to try the new erosion-control practice.

The first year about 150 acres of corn was planted in unplowed fields on 12 farms, in several different kinds of sods, small grains, and mulches. The results were very encouraging but problems were also encountered.

As researchers had demonstrated, atrazine does not kill all of the summer weeds. When the weed competition was not killed, the corn suffered severely for moisture.

The next year, by accident, some of the corn was planted in a dense, tall stand of rye that had been treated with atrazine. Although that year was a very dry one, the corn planted in the rye produced a better yield than corn planted in the conventional way or in perennial sod. Since that experience, most farmers using the district equipment have planted corn in rye rather than in sod.

The next year, 1965, was a wet year, and there were several high intensity rains when the corn was just beginning to come through the ground. Plowed cornfields suffered severe erosion, but the rye-mulch planted fields had practically no erosion, even on 20 to 25 percent slopes.

Among the first farmers to try the new practice in the Holston River District were J. R. and Conely Baker of Bristol. In 1966 they planted corn for the fourth consecutive year on the same land, using the rye-mulch method. Although their 80-acre farm is steep and rocky, no noticeable erosion has occurred. The corn yielded 25 to 30 tons of silage an acre the third and fourth years.

Conely Baker says, "We would have had to get out of the dairy business if it hadn't been for rye-mulch planted corn." Instead, the dairy herd has increased from 20 dairy cows to 70 cows, and the production per cow increased also.

Many farmers in the Holston River District are giving the rye-mulch corn planting method a good try because it enables them to produce more needed dairy feed without exposing their sloping land to excessive erosion.

In addition, the practice conserves moisture and fertilizer and improves the physical condition of the soil because of added organic matter from the sod or rye mulch.

It reduces the traffic of machinery over the land and allows more opportunity to spread manure on cornland when fields are wet in the spring. It is less expensive than the conventional method of plowing and disking before planting

Pete Lester (left) examines young corn in rye mulch. A group of farmers (right) look at corn growth for the fourth consecutive year on the same field by the mulch-planting method.

and cultivating to control weeds.

Essential to success with this method is a good stand of rye with a minimum of competitive weeds. Spray the rye field with 3 pounds of atrazine an acre 3 to 4 weeks before corn planting. Apply at least 50 pounds of liquid nitrogen to the acre, and add herbicide at the proper rate.

Use a suitable corn planter, either one adapted at home or with factory-made accessories. Increase the seeding rate somewhat to compensate for the likelihood of a poorer stand.

Additional fertilizer should be broadcast immediately after planting corn. In the Holston River District, 1,000 pounds of 5-10-10 an acre is used in addition to the liquid fertilizer. Watch closely for insect damage and apply a recommended insecticide immediately if needed.

The corn requires no further care until harvest. Immediately after harvest, broadcast 1½ to 2 bushels of rye an acre and disk lightly. Limited winter grazing of the rye is permissible, provided the crop is allowed to make sufficient growth for rye-mulch planting. ♦

Eliminating Wastes in Watercourses

The Papio Watershed Advisory Board estimates that property damage from solid waste discharge into the watercourses and roadside drainages amounts to $200,000 annually throughout a tri-county area including much of the Omaha metropolitan area.

If successful, the new method will provide countywide waste-disposal for residences on the outskirts of Omaha, combining benefits from channel stabilization, gully reclamation, and conservation. The new method is not expected to be the solution for all metropolitan solid waste needs. ♦

A Conservation Profile:

Carrots and Conservation Are Concerns of District Leader

CARROTS and conservation have been key rungs in the ladder of success for Sam Chinn of Salinas, Calif.

A native Californian, Chinn has lived on a farm in the Salinas area all his life.

Long known as a carrot grower, Chinn was introduced to soil and water conservation violently in September of 1959 when a flood virtually destroyed his carrot crop valued at nearly $60,000.

Being a man of action, he got his neighbors together and approached the Elkhorn Soil Conservation District for assistance on their flooding problem. Out of this meeting a group project between Chinn and his neighbors was laid out by SCS engineers. Through Agricultural Conservation Program cost-sharing, 16,900 feet of drains benefiting 260 acres were installed.

Mr. Chinn liked his first contact with the soil and water conservation movement and cast his lot with the Elkhorn Conservation District. He developed a conservation plan for his farm. And soon afterward, he became a director of the district.

Also created out of the initial contact between Chinn, his neighbors, and the Elkhorn District, was the Alisal - Gabilan Watershed Project designed to provide flood prevention, recreation, and agricultural water management. Chinn was appointed chairman of the steering committee for the project that has been recognized as a model for other steering committees to follow.

His leadership and zeal for soil and water conservation have carried him to other important positions. He has served as a commissioner of the State Soil Conservation District, president of the Calfornia Association of Soil Conservation Districts, and national councilman to the National Association of Soil and Water Conservation Districts.

Sam Chinn of California

Mr. Chinn is a member of the Soil Conservation Society of America. He is presently serving as a director of the Elkhorn Soil Conservation District, member of the California State Soil Conservation Commission, and western councilman of the National Association of Soil and Water Conservation Districts. ♦

Fewer Rural Residents

Between 1950-60 the percentage of rural residents in the United States dropped from 36 to 30 percent, while that of urban residents increased from 64 to 70 percent. ♦

Good Grass Backbone of Dairy Operation

"GOOD GRASS and plenty of good water make the backbone of my dairy operation. Cows have to have good feed and good water to make milk," comments Eugene Rosser, a Mason County farmer living near Washington, Ky.

Rosser's 106-acre farm is in hay and pasture, except for 18 acres of Burley tobacco and corn. Most of the cropland consists of highly productive silt loam soils of limestone origin.

These conservation operations include contour farming, conservation cropping systems, winter cover crops, stripcropping, grassed waterways, a farm pond, and establishing and managing pasture and hayland.

He and his wife have three children at home. Rosser's older brother also lives with them and helps with the farming.

Mr. Rosser began his farming career as a tenant farmer. It was then he learned about good farming practices, lessons which he never forgot. He feels conservation has paid off, for as he commented:

Eugene Rosser (right) and Soil Conservationist Ed King study contour stripcropping layout for the farm when Rosser was a tenant in 1957.

Rosser's children (left to right) Curtis, Gary, and Rita, fishing in the farm pond.

"This old farm has been real good to me and my family. I feel that I should do what I can to keep it in as good shape as possible."

Eugene Rosser believes in planning his farming operations and then working his plan—a bit of wisdom learned from his father. His father had become a cooperator with the Mason County Soil Conservation District as early as 1950.

After his father's death in 1957, Rosser returned to the home farm so he could provide and care for four of his brothers and a sister. His father's original conservation plan, which was in operation for 15 years, was revised in 1965 with the help of the Soil Conservation Service to bring it in line with present-day farming methods. The plan became part of the modernized program of the Mason County District.

In addition to farming his own land, Mr. Rosser grows about 3½ acres of tobacco and 12 acres of corn, on shares, on another farm. Also, during the tobacco harvesting season he "custom houses" tobacco. Last year he "custom housed" 43 acres. He considers this "spare time" work.

He is very proud of the six-stanchion milking barn which he recently built. He did all the work and remarked, "I like to build and make things. I get a lot of enjoyment out of knowing that I am doing something worthwhile with my hands and mind." The milking barn replaced a larger building which burned while his father was operating the farm.

Members of Eugene Rosser's family do not spend all their time working. The farm pond built in 1959 is stocked with bass and bluegills, and many enjoyable hours are spent in anticipation of catching the "big one."

Rosser also finds time, in spite of his busy work schedule, to take an active interest in community activities. As he puts it, "Our welfare depends on the kind of community we live in, and we make it what it is by the amount of time we give to it."—ROBERT M. CARLISLE, *Work Unit Conservationist, SCS, Mayville, Ky.* ♦

Beauty and Conservation Are Their Common Aim

Nurserymen Work to "Plant America"

Recognizing a national crisis in the beautification of our urban, suburban, and rural environment, the American Association of Nurserymen chose "America the Beautiful" as the theme of its annual convention at Bal Harbour, Fla., on July 8 to 12.

With its primary purpose of representing nursery stock producers, the AAN launched a "Plant America" program as long ago as 1950. Recently, the entire diversified membership was catapulted into action by Mrs. Lyndon B. Johnson's beautification program.

Whether producing or planting, the AAN's "merchants of beautification" are among the first to champion soil and water conservation. Nurserymen consider productive soil one of their most important capital investments.

Nurserymen must contend with several factors that cause loss of soil productivity. Among them are continuous cultivation, operations which must be carried out while the soil is wet, removal of soil when digging nursery stock, and difficulty of maintaining organic matter.

Conservation-minded nurseries which produce their stock in fields practice crop rotation, plow down organic matter, and use cover crops and mulches with careful fertilization and liming. Some nurserymen use container production with soil substitutes, but few have gone completely to container production.

Grassed waterways, contour cultivation, stripcropping, and windbreaks are common practices in modern nurseries. These practices, in combination with modern irrigation systems, enable nurserymen to get maximum results from the soil.

Landscape nurserymen, mail order nurserymen, and local retail nurserymen, in their contacts with customers, emphasize conservation practices. Landscape nurserymen and landscape contractors, in carrying out landscape planting projects, demonstrate conservation practices by fertilizing, mulching, and leaving shallow depressions around newly planted materials to gather the rainfall necessary to establish new plants.

Nurserymen produce and sell many conservation plants to consumers who are interested in ground cover on banks and steep slopes. Some nurseries specialize in vines, trees, and shrubs that provide food and shelter for wildlife. Others produce trees and shrubs which are used in establishing vegetation on spoil banks, dunes, and other exposed areas subject to severe erosion.—F. Raymond Brush, *Secretary, American Association of Nurserymen, Washington, D. C.*

Seedsmen Support Liaison Activity

When the American Seed Trade Association holds its 84th annual convention in Washington, D. C., June 25 to 28, more than 700 seedsmen from the United States, Canada, and several other countries will join people from Federal and State government agencies, Land-Grant Colleges, and allied organizations to discuss topics related to the seed trade.

Included are discussions on seed research and technology, State and national seed legislation, conservation, national beautification, foreign market development, breeders' rights, trade rules, seed improvement, and many others.

ASTA has an active membership of 550 seed companies. They produce and distribute all types of seed, including farm seed, garden seed, seed corn, lawn seed, sorghum, and native grasses.

The member companies work with SCS plant materials centers, Land-Grant Colleges, and private research institutions to increase and distribute adapted, improved, and recognized plant varieties on a continuous basis.

ASTA keeps its memberships informed on latest developments in soil and water conservation. It has a conservation committee composed of 30 leading seedsmen to recommend action on all phases of conservation. It also carries on liaison activities with the Soil Conservation Service and the Agricultural Stabilization and Conservation Service.—Bruce Price, *Assistant to the Executive Vice President of the American Seed Trade Association, Washington, D. C.* ♦

SCD Raises Money to Buy Fire Plow

Citizens of Lincoln County, Ark., have joined together to buy a blade for their new fire plow, in a community effort to fight forest fires.

Earlier this year, the State Forestry Commission gave the county a new plow and truck but had no further funds to buy a blade. The Lincoln County Soil and Water Conservation District officials asked businessmen of the area for donations, and more than 60 persons responded by contributing a total of $875. A new blade was purchased and the fire plow is now operational.

Forest fire control is important to landowners in Lincoln County because they have a large amount of timber and a growing sale of forest products. ♦

In the Neighborhood Youth Corps program 295 girls worked for soil conservation districts as clerks and typists.

Seepage, Drainage and Flow Nets. By Harry R. Cedergren. *1967. John Wiley & Sons, New York. 489 pages, illus. $13.50.*

This new textbook presents seepage theory and drainage principles in a practical manner with emphasis on methods of analysis that do not require high proficiency in advanced mathematics.

Methods are presented for an-analyzing and designing systems for controlling seepage and ground water in all major types of civil engineering works, including many situations commonly of concern in SCS engineering work, such as earth dams and levees, hydraulic structures, partially submerged structures, foundations, earth slopes, roads, airfields, and other surface facilities.

Theory is presented as it relates to basic seepage and drainage processes involving the security and economy of real engineering projects. The book features many examples, illustrations, and charts to aid the reader in applying seepage principles to everyday problems. —Harold C. Enderlin, *Assistant Director, Engineering Division, SCS.* ♦

The Role of Animal Agriculture in Meeting World Food Needs. *1966. Agricultural Research Institute, National Research Council, Washington, D. C. Proceedings of the Fifteenth Annual Meeting of the Agricultural Research Institute.* 260 *pp., illus.* $3.00.

This volume together with the proceedings of the 1965 meeting, *World Food Needs and Production: Present and Future,* provide a concise view of American agriculture in relation to the demands of needy nations.

Emphasis on food grains generally has overshadowed animal-produced foods in considering the problems of meeting world food needs. The Agricultural Research Institute, through its 1966 symposium, has helped to correct this imbalance.

The papers emphasize that animal protein is a widely accepted indicator of nutritional quality, and meat consumption is related to standard of living. In addition, animal agriculture can promote good land use and conservation of resources when properly developed and maintained. Few countries produce the animal products needed to maintain or improve the nutritional level of the diets of expanding populations.

Much interesting information is presented about livestock populations and production in relation to land and people. Minott Silliman, Jr., Resource Development Division, SCS, gives a detailed report on "The Land and Crop Basis for Animal Agriculture in the United States," and B. D. Blakely, head agronomist, SCS, is widely quoted in a paper by George K. Davis entitled, "The Modernization of Farming in Southeastern United States Through Animal Agriculture."

Conservationists will be pleased to note that much of the discussions are resource oriented.—Robert E. Williams, *Head Range Conservationist, SCS.*

New Publications

Are We Running Out of Water? By Raymond L. Nace. *1967. U. S. Dept. Int., Geol. Surv. Circ. 536. 7 pp.* This brief paper presents several fresh viewpoints on the so-called water crisis and a novel graphic representation of the total world water supply.

The United States is not running out of water, the author says, but people "are outrunning the supplies." Given rational management, U. S. supplies are adequate.

Unlike most previous appraisals, this one realistically includes soil moisture in the water budget. It estimates that, for a diet of bread alone, a population requires *consumptive use* of 300 gallons of water per capita a day—the amount needed to grow the wheat. For a diet of vegetable matter plus animal products, it requires 2,500 gallons a day; for food plus fiber, 3,000 gallons a day. All this is in addition to the 350 gallons a day (1,500 gallons of withdrawals) usually considered as the per capita water use in the United States, and most of it comes from the soil moisture reservoir.

In an effort to show the scale of the manageable water supply to the world total, the following illustration is used: If the total water in existence be considered as 1 barrel of 55 gallons, the oceans are represented by a tub of 50 gallons, icecaps and glaciers a block of ice containing 1 gallon, water involved annually in the hydrologic cycle a small glass of about 2 ounces, annual precipitation on land about one-half ounce, streamflow to the sea about 0.2 ounce, and annually recoverable ground water one very small drop.

Grass Seed Production and Harvest in the Great Plains. By M. D. Atkins and James E. Smith, Jr. *1967. USDA Farmer's Bulletin 2226. 30 pp. illus. $0.15.* Superseding Farmer's Bulletin 2112, this new bulletin will help farmers, ranchers, and technicians choose the native and introduced grasses best suited for their specific purposes. It also gives characteristics of some of the grasses and the best methods of producing, harvesting, and cleaning the seed.

During the past 35 years, plant specialists have scouted native grasslands to find grass plants with superior forage and good seed-production characteristics. Seed companies learned to select ranges that would yield enough seed to make commercial harvest profitable. Farmers, commercial seedsmen, and plant specialists learned to alter conventional equipment and to develop special machines for harvesting seeds. This bulletin is the product of all this experience.

1965 National Survey of Fishing and Hunting. *1966. U. S. Dept. of Int., Bureau of Sport Fisheries and Wildlife Resource Publ. 27. 76 pp., illus. $0.75.* A sequel to similar surveys conducted in 1955 and 1960, the latest summary shows an increase of some 3 million sportsmen, 50 million recreation days, and 4 billion total passenger miles over the figures recorded 5 years ago.

This study, conducted by the Bureau of the Census, includes data on sportsmen who participated on at least 3 days, or spent $5 or more, in fishing or hunting in 1965. A total of 33 million anglers and hunters spent $4 billion and traveled 31 billion passenger miles in 700 million recreation days.

Natural Resources of South Dakota. *1967. U. S. Dept. Int. 72 pp., illus. $0.65.* South Dakota with about 700,000 people ranks 40th among the States in population. Agriculture accounts for the principal economic interest. This beautifully illustrated book gives the history of the State and describes its physical characteristics, land and forests, water and power, parks and recreation, Indians, and their resource agencies. It is the 17th in the Department of the Interior's series of State booklets.

Your Water Supply and Forests. *1966. USDA Agr. Inf. Bul. 305. 17 pp. illus.* Superseding Leaflet 282, "Know Your Watersheds," this pamphlet discusses water and watersheds, with emphasis on forested watersheds. It tells how watersheds work, some benefits we get from them, what we must guard against, and what we can do to insure safe and dependable water supplies.

Americans at Mid-Decade. By U. S. Bureau of the Census. *Rev. 1966. U. S. Dept. Commerce, Series P–23, No. 16. 30 pp., illus. $0.40.* Brings together the most significant facts presented in the various series of current population reports. It portrays in summary terms the population of the United States at mid-decade.

USDA Leadership for a More Beautiful Countryside. *1966. USDA PA-779. 15 pp., illus.* Describes the ways Government agencies help cities and rural areas maintain or create beauty by controlling fires, floods, erosion, water pollution, plant diseases, harmful insects, and other pests.

Magnitude and Frequency of Floods in the United States—Part 2–B, South Atlantic Slope and Eastern Gulf of Mexico Basins, Ogeechee River to Pearl River. By H. H. Barnes, Jr., and H. G. Golden. *USDI, Geol. Surv. Water-Supply Paper 1674. 409 pp., plate in pocket. $2.*

Conservation Highlights 1966. By Soil Consergation Service. *1967. Unnumbered leaflet.* Digest of the Progress Report of the Soil Conservation Service.

The Proposed Comprehensive Plan for the National Capital. By National Capital Planning Commission. *1967. Washington, D. C (for sale by Superintendent of Documents). 230 pp., illus. $3.00.* An example of detailed land-use planning for an urban area.

Federal Focal Point in Outdoor Recreation. *1966. U. S. Dept. Int., Bureau of Outdoor Recreation. 75 pp., illus. $0.35.* This bulletin outlines the objectives and plans of the Bureau of Outdoor Recreation and lists the special area studies now underway.

Building for Clean Water. *1966. U. S. Dept. Int. 16 pp., illus.* A report on Federal incentive grants for municipal waste treatment and future construction needs.

Camping in the National Park System. By U. S. National Park Service. *1966 (rev.). U.S. Dept. of Interior. (24 pp.) $0.15.* Mainly a listing of camp grounds.

Focus on Clean Water. *Rev. 1966. Federal Water Pollution Control Admin. WP–7. 31 pp., illus. $0.15.* Some facts about water pollution and a proposed program for community organizations.

Careers in Soil Conservation Service. *Rev. 1967. USDA Misc. Pub. 717. 12-p. illus. folder.*

Soil Surveys

Madison County, Indiana. By Edward J. Schermerhorn. *1967. 89 pp., illus.; maps 4 inches to the mile (1:15,-840).* Fieldwork by P. Carmony, W. Kirkham, E. J. Schermerhorn, and others.

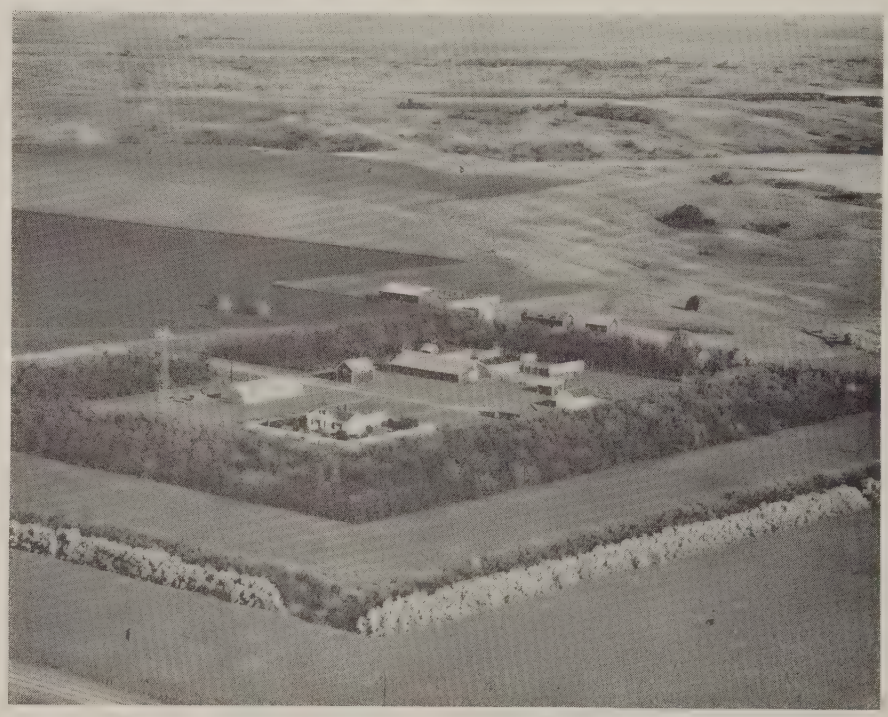
Tri-County Area, North Dakota. By Hollis W. Omodt, Fred W. Schroer, and C. R. Redmond, *1966. 94 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Gray County, Texas. By Jack D. Williams and Anthony J. Welker. *1966. 73 pp., illus; maps 3:17 inches to the mile (1:20,000).*

Las Vegas and Eldorado Valley Area, Nevada. By L. N. Langan, L. I. Larsen, and C. J. George. *1967. 87 pp., illus.; maps 2 inches to the mile (1:31,680).*

Hall County, Texas. By Earl R. Blakely. *1967. 77 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

AMERICA THE BEAUTIFUL COLOR LITHOGRAPHS



America The Beautiful—North Dakota USDA, Soil Conservation Service
FARMSTEAD WINDBREAKS, BARNES COUNTY SOIL CONSERVATION DISTRICT

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From the Administrator:

Urban and Suburban Conservation

THIS MONTH'S conference in Washington on "Soil, Water, and Suburbia" is indeed a new landmark in resource conservation and development.

The meeting is the first national conference devoted to the subject. It brings together for the first time, on a national basis, people responsible for soil and water conservation and land-use planning in both rural and urban areas.

The conference underscores the fact that the fundamentals are essentially the same wherever soil and water use problems are encountered. And it provides an opportunity for a mutually beneficial exchange of information on these problems between urban and rural planners and conservationists.

Joint sponsorship of the conference by the Departments of Agriculture and of Housing and Urban Development further emphasizes the interrelationship of interests and the opportunities for effective cooperation between city and country on resource conservation matters.

Beginning with personal participation by heads of the two Federal departments—Secretaries Orville L. Freeman of USDA and Robert C. Weaver of HUD—the agenda includes discussions that range from exploration of the economics of right and wrong land use decisions to some of the specific conservation methods applicable in suburban planning and development.

From the viewpoint of the Soil Conservation Service, the conference is a particularly valuable opportunity to acquaint nonfarm land use planners with sources of information on sound and tested methods of soil and water use that prevent waste, damage, and ugliness in suburban areas as well as on rural lands.

From the urban-oriented participants, USDA and soil and water conservation districts will learn how we can better serve nonagricultural land users as we all work together to tackle resource problems on a communitywide basis.

In the early days of the soil conservation movement we used to say that soil erosion was no respector of fencelines. This 1967 conference confirms a new variation of that truth: Soil and water problems do not recognize city, county, or other political boundaries!

Cooperation in Providing Plant Materials

Urban and suburban land users—homeowners, builders, and developers—will find, as have farmers and ranchers, that growing vegetation is a principal means of protecting soils from erosion, both during periods of construction and after the site is stabilized.

They will find a need, even more than farmers and ranchers, for special kinds of plants suited to the exceptional site conditions with which they must work. Adequate supplies of the right kinds of propagation materials are a crucial requirement of soil and water control on building sites.

Those concerned with urban and suburban soil and water use need to encourage effective working relationships with researchers and developers of specialized plant varieties and with the commercial producers and distributors of seeds, plants, and other propagation materials.

Cooperation is the key to soil and water conservation. On rural lands, we have experienced effective cooperation between land owners and users, their conservation districts, and other units of Government. No less important has been the teamwork of seedsmen, nurserymen, and conservationists.

Each year seedsmen handle more than 50 million pounds of the seeds of conservation grasses and legumes that had their origin in the plant materials centers of SCS. This is firm evidence of the teamwork that spells progress.

Seedsmen, nurserymen, and conservationists have much in common. Whether it is in providing seed, plants, or technical assistance, the objective is a profitable and permanently productive agriculture and a healthful and pleasing environment in which to live.

Throughout the country, the Soil Conservation Service has 20 plant materials centers to assemble, evaluate, and introduce plants for difficult conservation purposes. Informational programs stimulate demand as commercial production develops.

Nurserymen have long promoted beauty through the production and sale of landscaping and ornamental plants. Now beautification is also recognized as the proper business of seedsmen and the soil conservationists. Treatment of roadsides, streambanks, seashores, parks, and recreation areas has become big business calling for very specialized plants and cultural methods.

The land owner and user, the conservationist, and the supplier of seeds and plants are dependent on each other in meeting their responsibilities for protecting and improving our basic resource, the soil.

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Giant Reed Stops Blowing Sand on Citrus Trees

YUMA Citrus Grower G. L. Didier wanted to plant a new grove of lemon trees adjacent to raw desertland on the Yuma Mesa in southwestern Arizona.

Warm temperatures between March and October, plus water from the Colorado River, form an ideal combination for growing citrus. Didier, a cooperator of the Yuma Conservation District, already has more than 1,500 acres prospering under this abundance of sunshine and adequate water.

But Didier knew he was faced with a big problem:

Blowing sands driven by winds of up to 40 miles an hour sweep this desertland and when unchecked, damage young citrus extensively and undo the most careful job of land leveling. To protect his young trees, the Soil Conservation Service told Didier about a windbreak plant, called giant reed, that was being propagated by the Antelope Valley Soil Conservation District nursery.

Giant reed in 6 months grows 8 feet high and protects lemon trees from blowing sand.

The plant is adapted to the hot and dry climate of the desert Southwest. It requires only occasional irrigation during the summer after the year of establishment. A 2- to 3-year-old plant will grow more than 12 feet high and produce dense foliage. A plow or disk used along the edge of the windbreak prevents giant reed from spreading into irrigated fields.

Mr. Didier planted 1,500 rootlets of giant reed in the spring of 1965 at 2-foot intervals along the half mile of border between his citrus grove and the raw desert. He hauled water to the new plants at first until his grove irrigation system was completed.

In 6 months the plants grew more than 8 feet high and had bushed out to form a heavy protective wall of leaves and stalks which cut off much of the wind and sand.

The young citrus trees have been harmed very little by sand, although hundreds of cubic yards are piled on the windward side of the giant reed windbreak. — PAUL KAIL and JOHN COLVIN, JR., *formerly Work Unit Conservationist, Yuma, and Work Unit Conservationist, SCS Wellton, Ariz.* ♦

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JULY 1967
VOL. 32 NO. 12

Soil Conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE

Local . . .

Conservation is a local matter.

True, the consequences of resource use—or misuse—affect the whole Nation.

But every conservation act must be performed at a specific location, on a specific piece of real estate.

It follows that local units of government, through which people can deal with resource problems at home, must be the action arms of the Nation's conservation effort.

Cooperation: Soil Conservationist R. W. (Bob) Oertel has been in the midst of the activity swirling around growing Atlanta, Ga.

He writes from a good vantage point of how county, municipal, and other local officials put together a plan to counter Gwinnett County's growth problems (p. 267).

The result is an outstanding Resource Conservation and Development Project.

The Soil Base: In many places soils information is being used to guide land use changes.

In southeastern Wisconsin, Community Planner W. J. Kockelman and SCS Area Conservationist Howard Hass have labored together to fashion ordinances to direct development in harmony with soil characteristics (p. 273).

And in the San Francisco Bay area, the Black Mountain Soil Conservation District joined with other levels of local government to find safe standards for building on the area's hilly terrain (p. 276). Soil Conservationist Darwyn Briggs gives us an on-the-spot report.

COVER: An example of "leapfrog" development in the Santa Clara Valley of California that results in high costs to developers and higher taxes for adjoining farmland.

Soil Conservation

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SOIL CONSERVATION is the official organ of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. The printing of this publication was approved by the Bureau of the Budget July 25, 1963.

ORVILLE L. FREEMAN — Secretary of Agriculture
JOHN A. BAKER — Assistant Secretary of Agriculture
DONALD A. WILLIAMS — Administrator, Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service, U. S. Department of Agriculture, Washington, D. C. 20250

BEN O. OSBORN, Editor — GEORGIE A. KELLER, Production Editor

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Local Governments Lead the Way

Cooperative RC&D efforts mold a new Gwinnett County, Ga.

By R. W. Oertel
Assistant State Conservationist, SCS, Athens, Ga.

FACED with a whole host of "growth" problems that intensified daily, local government officials of Gwinnett County, Ga., decided to act. And act they did. The resulting Gwinnett County Resource Conservation and Development Project is bringing a new look to this suburban area of metropolitan Atlanta.

"We were having a hard time keeping ahead of the problems caused by so many new people moving into the county," says Uhland Freeman, former county commissioner.

"They were coming here to live, but most of them were working in Atlanta or some place else. We couldn't give them jobs at home, and we didn't have the extra taxes to provide all the additional services a growing population requires."

Demand for schools

B. B. Harris, county school superintendent, explained the pressure for new school buildings brought on by the rapid influx of new families.

"We've had to build schools at the rate of a room every week just to keep up. That costs a lot of money."

Miller Dial, chairman of the Upper Ocmulgee River Soil and Water Conservation District, remembers a different problem that prompted the local citizens to go the RC&D way.

"Land that used to grow crops was being gobbled up for other uses like the new interstate highway, new houses, and filling stations. What bothered us most was that all this change was taking place with little thought about the best use of the land. All this construction was causing more serious erosion and drainage and flooding problems than we'd seen for a long time."

Up until 1960 the various segments of the local government considered the steadily increasing pains of the rural-urban changeover largely as problems of individual agencies and groups. At that time Gwinnett County became a part of the 5-county Atlanta Metropolitan Area Planning and Development Commission. A county commissioner and one man appointed by the commissioners represented the county on the planning commission.

Gwinnett County Planning Commission members began to realize that such problems as land use, water supplies, sewage disposal, pollution, transportation, and open space were interrelated and were shared by neighboring counties.

Furthermore, they found that solutions to these problems would need to be considered on a regional basis. This was the basis of the work of the Atlanta Metropolitan Area Planning Commission under the direction of Glenn Bennett, executive director.

Meanwhile, the idea of some sort of further broad resource planning and development for Gwinnett

Ray Morgan (left), chairman of the Gwinnett County commissioners, and Scott Dee and K. A. McMillon of the RC&D Project board of directors discuss a new watershed structure in the county.

County was being explored seriously by the Agricultural Committee of the Chamber of Commerce. Representatives of various agricultural agencies, the Upper Ocmulgee Soil and Water Conservation District, the county and city governments, and the Atlanta Metropolitan Planning Commission joined with the Chamber of Commerce to plan for possible action.

RC&D comes along

The real break for the Gwinnett folks came with the enactment of the Food and Agriculture Act of 1962. This legislation authorized the Department of Agriculture to work with the local people to accelerate their resource planning. The Gwinnett County people were ready to take advantage of this new law and quickly took the steps necessary to organize the Gwinnett County RC&D Project. It became 1 of the first 10 projects in the Nation.

The Upper Ocmulgee River District and the Gwinnett County government sponsored the project. A board of directors made up of leading local citizens was established by the sponsors to represent them in developing and carrying out the project plan. Valuable leadership and support were provided by the Chamber of Commerce, Atlanta Metropolitan Planning Commission, city and county officials, and others.

Application and plan

The sponsors' application was found satisfactory by the Department of Agriculture, and the Secretary authorized planning assistance. SCS State Conservationist C. W. Chapman promptly appointed a project coordinator to help the local people develop a comprehensive project plan. The coordinator was to serve also as a focal point for assistance from other Federal, State, and local agencies.

Preparation of the work plan included four major phases: (a) An inventory of natural resources, (b) evaluation of the inventory findings, (c) development of alternative proposals, and (d) selection of specific project measures.

Many State and Federal agencies helped in the accumulation and study of resource data. Studies of population, housing, schools, income, and open space completed earlier by the Atlanta Metropolitan Planning Commission were made available to the RC&D board of directors. Other groups obtained up-to-date information on land, water, wildlife, forests, recreation, and industries.

The mass of information about the area's current resources and projected needs for the future was impressive to everyone involved in the preparation of the work plan.

"This was the first time we had really taken a serious look at what we had to work with in the county and what our needs would be in the years ahead," said R. L. Van Sant, the original chairman of the RC&D board of directors and present manager of the Chamber of Commerce.

"The real fun started when we began to decide how we could make the best uses of the resources for the good of the county as a whole. Everybody had ideas, and our big job was sorting them out and deciding which ones had the best possibilities."

The Gwinnett County RC&D Project plan eventually evolved after numerous planning sessions. Almost everyone interested in the future of Gwinnett County had taken a part and was proud of it. The planning process had proved to be the cohesive force pulling local people together to think about and plan for the future.

The completed plan was approved by the Georgia Soil and Water Conservation Committee acting in behalf of the Governor.

Putting the plan to work

The Secretary of Agriculture in January 1965 authorized Federal assistance to put the plan into operation, and local people moved into high gear to prove that the "plan" was not "bureaucratic wheel spinning" but a realistic blueprint for progress.

An increased SCS technical staff was assembled and headquartered in space donated by the county government. The Georgia Forestry Commission assigned a forester to the project and located him with the SCS staff in the RC&D headquarters.

The Information Committee and other RC&D committees moved into action, each promoting its particular portion of the plan. The RC&D story was carried to every nook and cranny of the area to create more interest, enthusiasm, and action.

The Agricultural Stabilization and Conservation Service stepped up its cost-sharing aid for land use conversions under the Cropland Conversion and Appalachia programs. The Georgia Agricultural Extension Service added a landscape specialist to its staff to help with beautification aspects of land-use planning. The Georgia Game and Fish Commission increased its technical assistance to landowners.

See the results

Representatives of local, State, and Federal agencies helping the sponsors carry out the plan have shown unusual teamwork talking about "our project." But shrewd leadership by the board of directors is also inspiring friendly competition between agencies. All of this is resulting in greater efforts by everyone toward achievement of the project goals.

Many accomplishments have been made in the 2 years since the plan was approved. All contribute toward the ultimate goal of developing and using the area's resources to raise the economic level of the people and provide for an orderly transition from a rural to an urban-fringe area.

A generalized soil map is being used to plan major land use

changes in the county. A detailed soil survey, now being published, will be useful in helping landowners develop conservation plans and in subdivision layout and design, sewage disposal planning, and industrial park development.

Through the stepped-up technical assistance program, 300 landowners have developed conservation plans, and more than 60 have revised existing plans. More than 1,000 cooperators with the Upper Ocmulgee River District have been helped to apply conservation measures. Consultive assistance has been given to more than 50 landowners and organizations.

Collectively, these land-treatment measures have created an estimated 500 man-years of employment annually with an income increase of $1,750,000.

Watershed-protection and flood-prevention work has been stepped up, and woodland improvement and management are making more efficient use of the forest resources. Wildlife management and the development of recreation facilities are bringing both income and recreation opportunities to thousands of residents. It is estimated that the watershed, wildlife, and recreation activities have added 347 man-years in employment with an annual income increase of $2,812,000.

A place to work

Industries outside Gwinnett County have become increasingly aware of the improvement in the total living environment as a result of RC&D activities. Already 19 new enterprises with a capital outlay of over $19 million have located in the new industrial parks being established. These industries have added jobs for 2,200 workers with an added annual income of $19 million.

Supporting measures consisting of public utilities, institutions, shopping centers, and the like have brought about an additional 254 man-years of employment with an esimated annual income increase of $3,405,000.

Planning conservation work at a construction site: (from left) W. S. Carrington, RC&D board of directors; George Norris, SCS; Al Rubin, branch manager, Globemaster Atlanta, Inc.; Lloyd Harris, RC&D Project coordinator.

Commissioners of the county government, RC&D directors, and the technical staff have given roadside erosion control and beautification their special attention. Sixty miles of roadsides have already been treated, and plans have now been completed to do 247 miles more this year.

Ray Morgan, chairman of the commissioners, is a firm believer in the roadside stabilization work. He justifies it by saying, "We commissioners know it makes good sense to stop erosion on these bare roadsides. The work saves considerable tax money because the roads are easier to maintain. Besides that, the roadbanks are a lot more attractive."

Conservation work on school and hospital grounds and areas around industrial plants and shopping centers is a fully recognized part of the work being carried on by local groups in the RC&D Project. Conservation plans to control erosion and drainage problems and to make the areas more attractive involve 23 school and 3 hospital grounds.

"We've come a long way in the past 2 years toward achieving the goals we set in our original work plan," stated Scott Dee, chairman, RC&D board of directors. "We've seen all segments of local, State, and Federal government team up with our local citizens in planning and carrying out this project. Everyone seems to be anxious to work with us for the good of the entire community." ♦

District Supervisors Have Five Degrees

The feeling that farming deserves the best in education spurred the people of St. Mary Soil and Water Conservation District, Louisiana, to select as their supervisors five men who hold college degrees, three bachelors', one master's, and one doctor's. Most of the degrees are in the field of agricultural science.

These conservation leaders are called on by many community, parish, and State groups to serve in places of responsibilities. Because of their capabilities and education, they now serve in positions for 30 such groups.—GENE WARREN, JR., *Assistant to State Conservationist, SCS, Alexandria, La.* ♦

An Answer to Drought

Conservation measures installed by Plains farmers buffer land against emergency

By William L. Vaught
Resource Development Division, SCS, Washington, D. C.

AS WINTER became spring this year, the Great Plains again was in the grip of a withering drought, with wheat failing in southern areas, stock ponds drying, grass still brown and brittle, and landowners worriedly waiting for moisture before going ahead with further planting.

The nightmare of the 1930's was being recalled by newsmen who wondered if another Dust Bowl was awaiting cue in the wings, and conditions were being compared with the start of the severe but less punishing drought of the 1950's.

Complete plan does it

As the succession of dry weeks continued, this conclusion was clear: Complete soil and water conservation, with the proper use and management of related resources, is a practical and profitable answer to drought and the other risks of Plains agriculture.

Any doubt about this must have been dispelled by now by the mounting evidence on the lands affected and by the testimony of landowners who had entered the Great Plains Conservation Program in its beginning years and had carried their contracts with Secretary of Agriculture through to completion.

The Great Plains Program alone was authorized by legislation in 1956 and put into operation in 1958 as a pilot effort to show that the work being carried on by landowners in cooperation with soil and water conservation districts can bring a new degree of security to land and economy in the Great Plains.

In the use of this unique regional program, conservation districts have furnished proof of their effectiveness as local entities through which people and their government—local, State, and Federal—can work together to develop and conserve natural resources for maximum benefit to all the people.

Conservation districts lead

The districts, administered by locally elected people, promptly provided the necessary leadership in getting the program into action. With two decades of experience already behind them, district leaders won the confidence and challenged the enterprise of landowners who realized the need for additional conservation work.

The program was an additional tool for use by the Soil Conservation Service and other agencies in assisting soil conservation districts. As one landowner entered the program and proceeded with his work, his neighbors became interested. Activity spread like ripples in a pond.

The Great Plains Conservation Program differs from the going program of the conservation districts throughout the country only in these elements: There is cost-sharing to enable the landowner to do the work fast and a schedule to provide order and system in doing it.

The essential difference is that the landowner sets out with a complete plan for all needed conservation work, knowing that he will carry it to completion, if he can, by a given date. Usually he seems to gain momentum as he proceeds, so that he finishes the job considerably ahead of schedule.

By the end of 1966, 7,886 landowners in 407 counties participating in the Great Plains Conservation Program had completed the work they set out to do.

One of them, Alfred Unterdahl, a cooperator with the Morton County Soil Conservation District in North Dakota, looks back to 1961, a dry year in his country. Unterdahl that year had a successful crop, but "most people didn't bother to take their harvesting machinery out of the barn," he said.

Val Gervin, also in North Dakota, reports better income from his livestock, with grasslands more productive, water where it is needed for uniform grazing, and heavier steers at sale time.

One of the first ranchers in Wyoming to enter the program was Jack Simpson near Moorcroft in the Buffalo Belle Soil and Water Conservation District. As a business investment, Simpson looks back on his work under the Great Plains Conservation Program as sound and profitable—to the extent of making his income 10 percent better.

"But I didn't do anything that didn't need to be done as a matter of good business," was his explanation.

A brighter future

There was the 1960 crop year, unsatisfactory for most farmers in the area. Simpson's wheat, benefiting from extra moisture he was able to save with terracing and stubble mulching, gave him between 15 and 16 bushels an acre. Most growers in that area didn't harvest.

The 1966 season was relatively short, moisture-wise. Most producers were happy with 19 to 20 bushels an acre. Simpson, with his cropland in improving condition, harvested nearly 26 bushels an acre.

The community of Hawley in the

The added incentive provided in the Great Plains Conservation Program has been useful in small watershed projects in the Plains. This is the William J. Gentry place, Bead Mountain, in the Gering Drain Watershed Project in the Scotts Bluff Soil and Water Conservation District of Nebraska. Complete land treatment lends support to the watershed's engineering works. Bead Mountain was a landmark for the wagon trains on the historic Oregon Trail of pioneer days.

Middle Clear Fork Soil and Water Conservation District in Texas has brightened its appearance and economic future as a result of investment by a substantial number of its citizens in complete soil and water conservation. Dense stands of "shinnery" brush—48,000 acres of it—preventing the growth of grass, was holding back profitable use of the land resource.

More than 40 landowners, most of whom used the accelerated technical help and cost-sharing offered under the Great Plains Program, have brought 10,000 acres of the thick-growing shinnery under control. By using this program in conjunction with ACP cost-sharing and FHA credit, landowners have replaced expanses of useless brush with pasture grasses. Land that was producing nothing is bringing in income. Homes are being built in now-attractive settings. Contractors are busy. Land values are going up as opportunity is recognized. Other landowners are ready to start on their conservation plans.

The Great Plains Conservation Program has given welcome support to small watershed projects in the Plains. In the Gering Drain Project in western Nebraska, extensive land treatment, with many landowners participating in the Great Plains Program, made floodwater-retarding structures unnecessary in the southeastern part of the project area where agriculture is mainly of the dryland kind. Conservation practices on the watershed have given needed control of the runoff that can be expected

A vigorous stand of native grasses on a range area that has been cleared of shinnery (left) under the Great Plains Conservation Program pleases SCS Work Unit Conservationist Joe Pat Henson of Anson, Tex. The area was covered with dense and unprofitable brush (right).

from the area in a rainstorm.

In the Kent Creek Project in Texas' Cap Rock and Hall County Soil and water Conservation Districts, 90 percent of the needed land treatment has been applied by landowners, many of whom used help from the Great Plains Program.

Complete soil and water conservation plans cover 26,186 acres of the project area. Of the 51 operating units above the 7 structures in the project, more than half have installed Great Plains Conservation Program plans. Of 89 landowners below the structures, 40 are using Great Plains Program assistance. The needed practices in 24 of the 66 Great Plains contracts in the project have been fully applied.

The outlook: More effective floodwater reduction, a longer project life, and more efficient use of the area resources in the project.

County governments are finding ways to make use of some of the conservation practices being installed. The county road right-of-way often provides a practical location for a needed conservation structure, such as a stock water or erosion control dam. Many times the dam can be adapted to serve as a bridge or culvert. Cooperative agreements covering the working arrangements and the division of cost and responsibilities for construction and maintenance are easily worked out.

The number of landowners engaging in the program long since passed the 25,000 mark. As a thousand or more complete their work each year, their places are taken by other landowners ready to begin. There has generally been a backlog of 4,500 to 5,000 waiting to enter the program.

At last accounting the cropland converted to grassland in the program had reached 1,050,000 acres. This—especially the changing of unsuitable cropland to grass or tree cover—had been a prime objective in the program from the outset.

Nearly 800,000 acres of damaged or depleted rangeland has been seeded to protective, productive grasses.

Terracing? There are more than 35,800 miles of it applied.

The control of brush, in a battle still not being won, has totaled 2 953.000 acres.

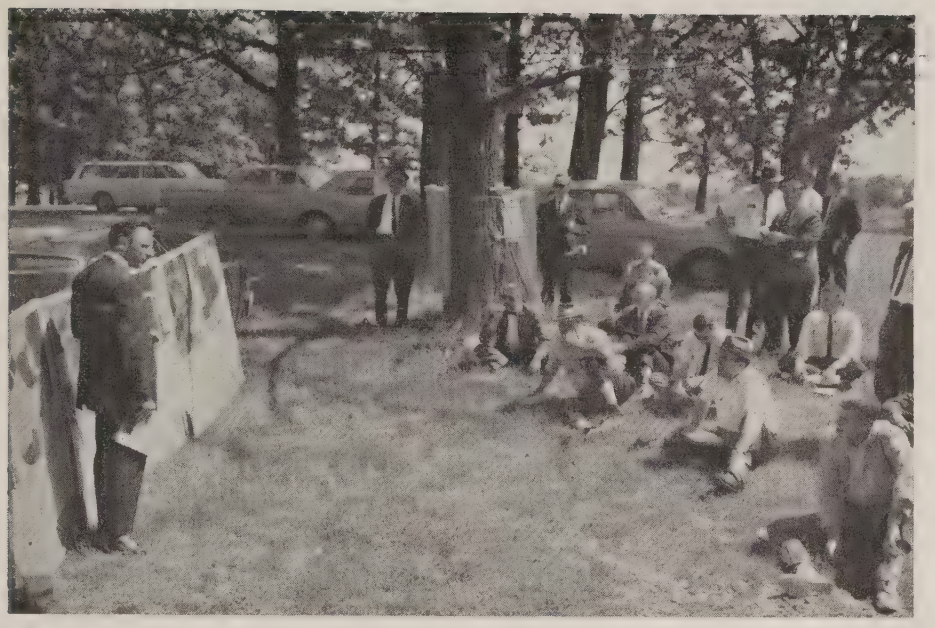
As for water, the program has accounted for nearly 10,000 wells for livestock, with 13,400 dams, pits, and ponds mainly for livestock use, and 1,005 spring and seep developments.

The "treeless" Plains country has been garnished with 21,250 acres of tree windbreaks to protect fields, farmsteads, and wildlife and to lend additional green beauty to the Plains landscape.

Add this to the work being carried on in the regular program of the soil and water conservation districts and other programs in the Plains and you have a significant new barrier against drought and other emergencies. ♦

Consumers Will Benefit from REA Loans

Nearly 7,700 consumers in 9 States will receive electric service as part of benefits resulting from $7,455,000 in loans approved by REA. To provide new service and to improve service for present consumers, REA-financed rural electric systems will construct 617 miles of distribution line, 16 miles of transmission line, 9 substations, and headquarters facilities. ♦



W. J. Kockelman explains to a group of citizens and developers the use of soil survey information in planning a residential development.

Tool for Town Planning

By Howard C. Hass and W. J. Kockelman

Area Conservationist, SCS, and Chief Community Planner, Southeastern Wisconsin Regional Planning Commission, Waukesha, Wis.

SOIL SURVEYS are extremely useful tools for proper community development. Besides helping public officials make land use decisions, graphically interpreted soil facts help the public to understand and support these decisions.

Backing up these statements are two ordinances recently adopted by local units of government in the seven-county Southeastern Wisconsin Planning Region.

One ordinance for Walworth County regulates private water supply and sewage disposal systems throughout the county's 16 civil towns, 4 cities, and 7 villages. Another, for the town of Belgium in Ozaukee County places farmland into an exclusive "A-1" zoning district which permits only agricultural use.

Both ordinances are believed to be among the first of their type in the Nation. And both draw their background and their support from soil surveys.

The Soil Conservation Service in cooperation with the Wisconsin Agricultural Experiment Station made a detailed soil survey for the counties of Kenosha, Milwaukee, Ozaukee, Racine. Walworth, Washington, and Waukesha during 1963-65. The Southeastern Wisconsin Regional Planning Commission contributed $130,000 to the cost of the survey.

Following the survey, the commission—in cooperation with SCS, the Wisconsin Cooperative Extension Service, and the soil and water conservation district in each county—began an educational program to show how soil surveys could be used for community planning and development. The goal is to reach all of the 153 local units of government with the educational, advisory, and review services offered by the commission's community assistance program.

Acting as a team, the commission and the cooperating agencies hold conferences and workshops; prepare news releases; provide soil maps and interpretations; prepare course outlines and display materials; and work with groups known to have a special interest in soil survey data. It's all coordinated through a detailed "memorandum of understanding" between the cooperating groups.

Demonstration site

One educational project is on the Waukesha County Farm. Here, 160 acres has been set aside as a soil demonstration site. The Regional Planning Commission, SCS, and the Waukesha County Park and Planning Commission developed land use plans for the site. The Waukesha County Extension Service sponsored and coordinated the project, and the University of Wisconsin gave technical and advisory assistance.

Information from the detailed soil maps was used to plan alternate uses of land, such as agriculture, residential with septic tank systems, residential with public sewer, industrial and recreation.

The soil facts were used first to develop a farm conservation plan related to the agricultural capabilities of the soils. Then two residential plans were prepared, one with large lots serviced by septic tank systems and another serviced by a public sanitary sewer system. The lots, dwellings, and filter fields are carefully located so as to avoid the soils that have "severe" or "very severe" limitations for such development.

Industrial and recreational land use development proposals also were made for the 160-acre demonstration site, each carefully related to the limitations of the soils for such uses.

Interested groups come to the

farm where they are shown large multicolored maps that locate the soils and describe their limitations for various rural and urban uses. Permanent pits have been dug at various locations to show soil layers and differences in soil material and structure.

Residential land developers visiting the site are able to see real examples of soil problems and their remedies. Architects and engineers are shown how soil maps can help them locate better building sites or alert them to the necessity for special design measures to overcome certain soil limitations. Surveyors who run percolation tests for septic tank filter fields can get a better understanding of soil differences and recognize high or fluctuating water tables where septic tank systems would not be approved by the State Board of Health.

Action in Walworth

The ordinances adopted by Walworth County and the town of Belgium are evidence of the effectiveness of this type of educational program.

Walworth County, just north of the Illinois State line, is an area of excellent farmland and scenic water areas—and of rapid urbanization since World War II. Much of Walworth County's development is being serviced by private well and septic tank systems instead of public water supply and sewerage systems. These brought problems.

"Foul-smelling lakeshores, contaminated wells, backyards saturated with sewerage effluent, and children with diarrhea were some of the problems and heartaches which prompted the county board to adopt a new sanitary ordinance," said Eugene A. Hollister, Walworth County supervisor.

On June 14, 1966, the county supervisors adopted a resolution directing certain county committees to prepare a sanitary ordinance aimed at: (1) Protection of health, (2) safety from disease and pestilence, (3) conservation and wise use of land and water resources, (4) preservation and promotion of the beauty of the county and its communities.

The ordinance was prepared by the Regional Planning Commission's community planning staff in close cooperation with the county health and zoning committees, the State board of health, and SCS.

The ordinance prohibits onsite sewage effluent disposal systems (filter fields) on soils that have very severe limitations such as flooding, high or fluctuating water tables, shallow depth to bedrock, ground-water contamination or ponding, overflow, runoff, or overwash.

It also prohibits this type of disposal system on soils which have severe limitations because of steep slopes or slow permeability, unless the applicant provides larger or alternate filter fields, terracing or reduction of steep slopes, or other corrective measures.

The ordinance also prohibits outdoor toilets, privies, and cesspools and the discharge of noxious and toxic material into lakes, watercourses, storm sewers, and drainage ditches. Many of the State board of health regulations pertaining to well and septic systems were adopted by reference. But greater distances from property lines, lakes, and streams were specified for wells, septic tanks, and filter fields; and larger capacities were specified for septic tanks.

On September 14, 1966, the county board passed the ordinance and created a position of sanitary inspector to administer it.

Spring floods isolate new houses in a residential area laid out without respect to the suitability of soils. Such unexpected problems are avoided where developers make use of soils and hydrologic information now available to them in southeastern Wisconsin Planning Region.

James A. Johnson, the new sanitary inspector, reports that, "Although in effect for only a short time, the sanitary ordinance has already promoted significant improvements in the design and installation of onsite sewage absorption disposal systems."

Zoning for Belgium

The town of Belgium lies in northeastern Ozaukee County, north of Milwaukee along Lake Michigan. Residents wanted to maintain productive farming operations, protect land and water resources, and prevent indiscriminate home building with inoperative sewage disposal systems.

"Soils with very severe limitations for urban development yet highly productive for farming, plus the disorder and costs connected with urban sprawl, were factors resulting in the adoption of our town's first zoning ordinance," said John W. Krier, town chairman. This ordinance divides the 37-square-mile town into several unique, exclusive districts.

Inventories showed that the town of Belgium contained lands with high agricultural capabilities, a high-value potential park site, wildlife habitat, and several areas with stands of commercial timber. But most of the soils in the town have severe or very severe limitations, either for private disposal systems or public sewer systems, because of flooding, high or fluctuating water tables, slow permeability, overflow hazards, or steep slopes along Lake Michigan.

A proposed zoning ordinance was prepared by the Regional Planning Commission's community planning staff with technical assistance by SCS. This ordinance placed the town's farmlands in an exclusive "A-1" zoning district which permits only agricultural uses. Farm dwellings are permitted only as an accessory use to the principal agricultural use, thereby avoiding unplanned, uneconomical, inefficient, and scattered subdivisions.

All drainageways, wildlife areas, stands of commercial timber, and wet lands not used for farming were placed in an exclusive "C-1" conservancy district. This district permits uses such as water-retention areas, floodways, wildlife preservation, fish hatcheries, fishing, hunting, and sustained yield forestry, as principal uses; grazing, orchards, truck farming, and wildcrop harvesting as conditional uses. It prohibits dumping, filling, cultivation, and mineral, soil, or peat removal or any other use that would substantially disturb or be detrimental to the natural flora, fauna, water regimen, or topography.

In addition, the zoning ordinance prohibits onsite filter fields on soils that have very severe limitations for such systems. Soils with severe limitations for such systems are carefully regulated.

Success of these ordinances in minimizing the problems of rapid urbanization shows that care of land and water resources contributes to the health, safety, beauty, prosperity, and general welfare of communities.

Close cooperation and coordination between local and regional planning staffs, conservation district supervisors, SCS conservationists, and county agents are necessary for thorough public understanding of soil survey data and their use by public officials for community planning and development. ♦

Cattle and Grass Good Enterprise

A COOPERATOR with the Coal County Soil and Water Conservation District, near Lehigh, Okla., O. F. Fowler believes in, and practices, soil and water conservation.

Mr. Fowler operates a 220-acre beef cattle enterprise. He thinks well of lovegrass for erosion control. When fertilized it is good for grazing, and it makes good hay for the cattle, he says.

O. F. Fowler uses lovegrass to control erosion, produce hay, and to graze.

He developed a good native grass meadow by cutting out brush and trees by hand. He completed clearing timber off his more level woodland, planted it to bermudagrass, and applied lime and fertilizer according to needs shown by a soil test by the Extension Service.

O. F. Fowler is participating in the Agricultural Conservation Program of conservation practices for pasture improvement. His pasture program uses tame and native grasses in combination. Cattle are taken off the lovegrass and native grasses during the fall and winter. Bermudagrass is grazed during the spring, summer, and fall.

"Saving some grass for fall and winter grazing saves expenses on the winter feed bill," he says.

Since his beef cattle unit is too small to take up all his time, Fowler finds time to do custom hauling for his neighbors and has developed good relations with them. They help each other by exchanging work when extra labor and equipment are needed.

The Fowlers have three children and two grandsons, and Mrs. Fowler is a teacher in the Atoka school system. ♦

The stereotyped pattern of development with similar houses crowded together on small barren lots (above) does not always bring the highest returns to the builder. Fewer houses clustered on "view" lots or larger homes carefully located in the terrain with green space between create fewer erosion problems and are attractive to buyers.

To guard and enhance its heritage . . .

District Takes a Hand in Hillside Development

By Darwyn H. Briggs
Soil Conservationist, SCS, Berkeley, Calif.

DIRECTORS of California's Black Mountain Soil Conservation District on the southern rim of the rapidly urbanizing San Francisco Bay area have changed their methods of working with landowners to keep pace with changing land use problems. This change is in keeping with their goal of "conservation of all land regardless of use."

The 40,000-acre district extends from the floor of Santa Clara Valley to the crest of Santa Cruz Mountains to the West.

In the past 20 years the district has changed from a rural vineyards-and-orchards area to one of subdivisions and estates. Its residents now are largely oriented to large defense industries.

The group approach

Finding onsite planning assistance to each landowner no longer feasible because of the increase in numbers, the district directors decided to concentrate on working with groups of people.

One of the first efforts in this direction was the preparation and publication of a "Hillside Development Guide"—a manual on soil and water conservation problems associated with building on the hilly terrain of the district.

The guide brought together information and recommendations from the Soil Conservation Service and from other agencies or units of government, including Santa Clara

County Departments of Planning, Health, and Public Works; County Fire Marshal; Cooperative Extension Service; California Division of Forestry; and planning departments of the cities of San Jose, Saratoga, and Palo Alto.

The publication contains detailed guidelines on the needs of domestic and fire-control water supplies, sewage disposal, building foundation stability, and erosion hazards as related to soil resources.

An associate

Nonagricultural and engineering interpretations of the district's soils are based on criteria developed

The expensive damage caused by a mudflow (left) could have been prevented through proper site selection and protective conservation engineering on the hillside to the foreground. Homeowners too often have to learn from their own experience (right) that it is unsafe to build on a flood plain, even of a small stream.

in cooperation with members of private engineering, planning, and landscape architectural firms.

As a result of this joint effort, consultants now look on the soil conservation district as an associate and cooperator rather than a potential competitor in planning, engineering, and landscaping phases of hillside development.

The guide contains four single-factor maps, color-keyed to land development limitations based on soils information. For each soil area in the district, the maps show the degree of limitations for building foundations and for septic tank filter fields, the soil's hydrologic grouping, and its capability for agriculture.

The California State Senate Fact Finding Committee on Local Government, after having the guide presented in testimony at a hearing, adopted it as the committee's annual report—a report distributed statewide to city and county planning officials as an example of cooperative planning and development.

District cooperation

As a result of the district's cooperation with other local governmental units, the city of San Jose asked the SCS soil conservationist to serve on its Hillside Advisory Committee to the City Planning Commission. The city's new Hillside Subdivision Ordinance contains provisions for homesite selection based on soil factors, erosion hazard, and conservation planting requirements.

San Jose City Planning Director Sanford Getreu says, "This protection of the hillsides and mountain areas is not to prevent or impede development but to guide that development to preserve and enhance the natural amenities of the city's heritage."

Two other major cities in the district, Palo Alto and Cupertino, have asked the district to review proposed hillside developments before their City Planning Commissions take action. The directors, assisted by the SCS staff, are making a comprehensive review and will report soil and other resource interpretations which should be considered for the orderly development of each tract of land.

The district also assists city and county planning departments by providing them with the resource data necessary for guiding development and for the periodic review of their general plans as required by State law.

Other district services include special interpretations of soil surveys for the planning and development of subdivisions, industrial plants, parks, and golf courses.

Agriculturists in Black Mountain Soil Conservation District are still provided with onsite technical assistance as before.

Directors of Black Mountain District and SCS staff members participate in local, regional, and statewide meetings. In 1965 the district was represented, for example, at the University of California City-Regional Planning Course and at the California State Soil Conservation Commission Special Long Range Planning Committee meetings.

The district also was represented at a regional foothill development conference with the theme, "The Shape of the Future"—a meeting sponsored by 70 organizations in the San Francisco Bay area and attended by more than 650 persons. Speakers from across the Nation discussed problems of urban development in foothill areas at the conference. ♦

Crops Saved From Wind-Blown Sand

EVERY SPRING the Miller Brothers of Milan, Ohio, saw high western winds dip into the 40-inch deep Galen, Arkport, and Oshtemo sandy loam of Erie County and sandblast their truck crops off the early market.

Now, they plant at right angles to the prevailing winds, leave rye and alfalfa in alternate cover strips, and maintain surface organic matter. Merlyn and Alto Miller haven't lost a crop since 1963.

That was the year they set up wind-erosion control practices as cooperators with the Erie Soil Conservation District. Cooperative Extension Agent Floren James and I studied the problem area and suggested planting their sugar beets in strips north and south across the prevailing winds.

The Millers observed that damage usually started about 100 feet from the edge of the field. The field strips, therefore, were made 100 feet wide. As a test, they made one strip 120 feet wide and another 80 feet for comparison. They used a "rotovator" to eliminate dead furrows and keep most organic matter near the surface.

This project was so successful that most of the farm was converted to north-south tillage the next year. The 100-foot strips were most satisfactory. Early truck crops are planted with rye or alfalfa in strips between.

The cover crop can be used in many combinations. In early April 1965 the Millers planted cabbage in 100-foot rotovated alfalfa field strips. Tomatoes were planted in the alternate field strips when the danger of the wind erosion was past, about 3 to 4 weeks later.

Sugar beets were put in a field seeded to rye. A 10-foot strip of rye was left between each 100-foot strip of sugar beets to control the wind erosion. After the sugar beets had a good start, the rye was knocked down to conserve moisture.

These methods and good fertility practices have maintained crop yields for the Millers since 1963.—LORING E. BEERBOWER, *Soil Conservationist, SCS, Sandusky, Ohio.* ♦

Dual-Purpose Road Fills Make Lakes in Kansas Highway Program

By Franklin C. Kinsey
Area Engineer, SCS, Manhattan, Kans.

KANSAS motorists can look forward to smooth rides with increasingly better views—thanks to imaginative planning by the State Highway Commission, private landowners, and several conservation agencies.

The views will be of new artificial lakes scattered along the highways. The smooth rides will be over the combination earth dams and road fills that produced the lakes by trapping runoff rainwater from surrounding land.

Besides giving a beauty treatment to the Kansas countryside, the cooperative projects hold lots of promise for conservation and recreation uses.

Many will be ideal areas for family picnicking, fishing, and other water-based pleasures. All will provide some protection from soil washing and flood hazards through temporary storage of heavy rainfall. In certain locations they can be used to water thirsty plants and livestock.

In the rolling hills of east north-central Kansas, the Soil Conservation Service, local soil conservation districts, and the highway commission have already installed 14 of these cooperative projects on State and Federal highways. Thirty-four have been installed on county and township highways.

Back in 1958 the State Highway Commission of Kansas began furnishing maps of proposed highway construction to the Soil Conservation Service and local soil conservation districts. By 1961 the need for mutual planning for good roads and land-protection practices was well established. At that time the State Highway Commission, the Soil Conservation Service in Kansas, and the State Soil Conservation Committee entered into a formal working arrangement. Refinements and agreements with other agencies have followed.

An investigation of the proposed location is made by conservation agencies and the landowner to determine suitability for a lake, and any problems which might be encountered. Should the parties involved agree to build the dam, engineers for State Highway Commission and SCS calculate the size of lake needed to contain the runoff rainwater during a large storm.

State Highway Commission designs and constructs the dam as part of its overall highway improvement plan. The local soil conservation district has responsibility for obtaining easements which allow water to be trapped and held on land controlled by power and utility companies, neighboring farmers, sportsmen's groups, and local governments. Thus, the entire venture is truly a cooperative project.

When the dam costs less than a bridge or culvert, the entire construction cost is paid by the highway commission. In the rolling hills of east north-central Kansas these projects quite often result in savings of $10,000 or more for each project. ♦

A level fill impounding a small lake now provides a broad base for a paved road (above) where formerly the country lane dipped down to a crossing over a metal culvert. A drop inlet spillway now carries excess runoff water under the road.

Dairyman Converts Entire Farm to Grass

"THE BEST WAY to keep the river from getting muddy is to tie the land down with grass," says Ralph Lucy of DeKalb County, Ala.

Mr. Lucy practices what he preaches, too. Since he quit growing cotton and corn several years ago, he has planted his entire farm to permanent grass.

He and his son, Don, operate a 190-acre dairy farm on Lookout Mountain near Fort Payne. To the Lucys, dairying is a family operation. "Our secret to staying in business is to do our own work," Ralph Lucy comments. His wife, Stella, and Don's wife, Freda, pitch right in with the milking of their 70-cow herd.

With the farm in grass, the land is protected from erosion, and, as Lucy puts it, "The land is productive all year long—not just for 3 or 4 months."

When Mr. Lucy switched to grassland farming, he was guided by his conservation plan. Agricultural Conservation Program cost-share assistance helped him get his pasture established.

Owner Ralph Lucy points out to SCS Conservationist W. J. Berry a highway underpass for the dairy herd. Lucy's home and dairy barn are in background.

Don Lucy and mother, Mrs. Stella Lucy, stand by some of the modern equipment in the new milking parlor.

Today, his program consists of 153 acres of perennial grasses and legumes. Kentucky 31 fescue, dallisgrass, bermudagrass, and white clover furnish top-quality grazing. Hay is cut from a well-fertilized orchardgrass-white clover mixture. Each year, almost 120 tons of high quality hay is saved and fed free-choice twice a day. Cows also get a helping of 16 percent dairy feed at milking time.

Two farm ponds provide water for the dairy cows and recreation for the family. Both are stocked with bass and bream. Soil Conservation Service technicians assisted with the design and layout.

The Lucys have just installed a modern parlor-type milking barn. An automatic feeder designed by Don Lucy keeps fresh feed in the trough as each cow comes in for milking.

Ralph Lucy has been a cooperator with the DeKalb County Soil Conservation District since 1956 and now serves as a supervisor in his local district. He is also past president of the DeKalb County Dairy Association, representative

from the DeKalb Farm Bureau Commodity Committee, a trustee of the Alabama Dairy Association, and a member of the Fischer Community Rescue Squad. Everyone in the family is active in the Union Hill Baptist Church.

Keeping things going is a regular job for the family. Unlike the 40-acre row crop farm of 12 years ago, however, it's paying off. By rotating weekend milking chores, everyone has time off, too.

The dairy operation is not only conserving and improving the land, it also is keeping the family together.—W. J. Berry, *Work Unit Conservationist, SCS, Fort Payne, Ala.* ♦

Boys Club Sends SCS Photos to Europe

The Springfield, Pa., Interact Boys Club is using America the Beautiful lithographs to spread in foreign countries goodwill and a better understanding of the United States.

The boys have divided two sets of the Soil Conservation Service color pictures among Interact (International Action) clubs and exchange students in France and Germany. Sponsored by the Rotary Club, Interact is a worldwide organization of boys of high school age dedicated to international understanding.

Raymond S. Lambert, the Springfield Rotary Club's adviser to Interact, learned about the America the Beautiful photographs in a Government publication. He told the boys about them and they voted to send two sets to Europe.

"If the boys get a response from this distribution, they'll carry this idea further," Lambert said. "It's the boys' hope that these pictures will help spread goodwill by passing on pictorial information about conservation projects in this country. We'd like to start an exchange of pictures, a sort of pictorial pen-pal correspondence." ♦

Two-Way Radio System Speeds Watershed Engineering Work

By using a two-way radio communications system, the accomplishments of layout and checking crews on a watershed project in Arkansas have been increased 40 percent without any increase in personnel.

SCS officials in Arkansas say the system has been so successful in the West Fork and East Fork of Point Remove Creek watershed that a similar system will be installed in two other Arkansas watershed project areas.

The short-wave radio system makes it possible for survey crew members to keep in contact with all construction sites, so they know where and when they are needed.

The system operates between Morrilton, Ark., and 32 dam construction sites. It includes a base station at the project office with a 30-foot tower and antenna and 9 mobile units used by the inspectors, assistant inspectors, the project engineer, and the survey crew. There is an automatic repeater station with an 80-foot tower and antenna on the highest ridge in the watershed.

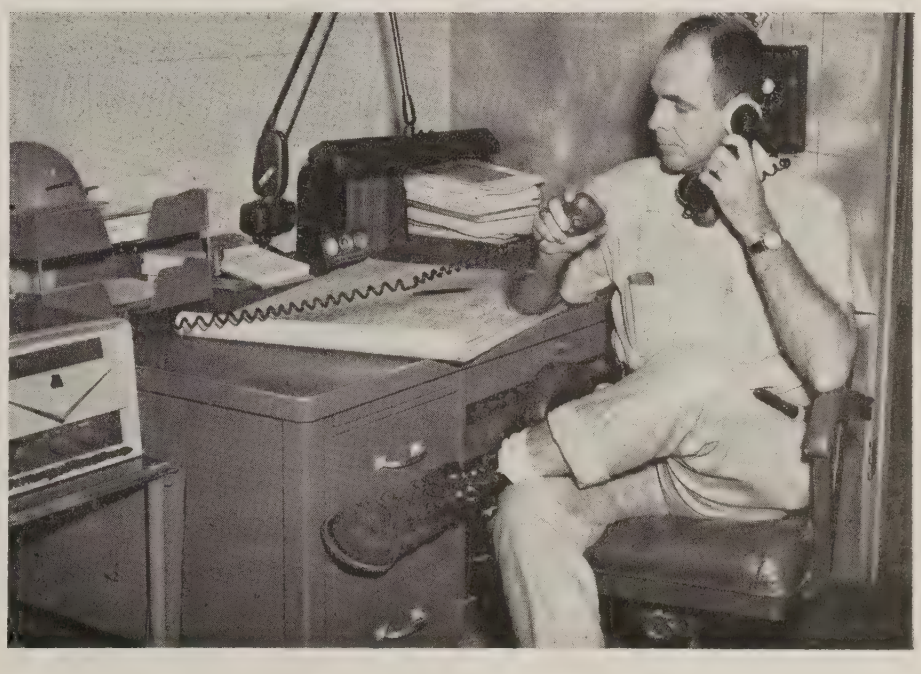
The range of communications varies from 25 miles in steeply rolling to mountainous watersheds up to 60 miles down in the valley.

The system makes possible more efficient and economical use of equipment and personnel and provides good communications between some remotely located sites and the project office, according to Clifford M. Brown, project engineer.

Brown said the new system eliminates the need for inspectors to visit him at home after regular working hours and allows him to substitute radio conversations for some trips. It also provides a means to quickly summon medical help in case of an accident. Fortunately, this has not been necessary.

Gene Austin of Austin Brothers Construction Company comments: "The communications system

Clifford Brown, project engineer, receives information from the Arkansas SCS State office and relays it to an engineer in charge of construction at one of the watershed sites.



helps us contractors, too. We can get quick answers if we run into trouble."

And Bob Hardy, general superintendent of Southeast Construction Company, adds:

"I've never worked any place where I got quicker action on a problem."

The total cost of the radio communication system was $7,000. W. B. Davey, SCS State Conservationist at Little Rock, said a $5,000 system is also being installed in the watershed project office at Waldron. This includes a base station, five mobile units, and a repeater station to serve the Poteau River and the Little Clear Creek watersheds. Seventeen floodwater-retarding structures and three large multipurpose dams are being built in the area.

Davey added that plans "are on the board" for a similar radio communications system for the Walnut Ridge Project office. It will serve the Flat Creek, Cooper Creek, Upper Tri-County, Lower Tri-County, Mud Creek, and Fourche Creek watersheds.

The radio systems can be moved from one location to another as one project is completed and another started. The operation of radio communications systems, including assignment of frequencies and station locations, is subject to the approval of the Interagency Radio Advisory Committee.—LYLE BOBECK, *Construction Engineer, SCS, Little Rock, Ark.* ♦

Recreation Is Big Factor in Farm Income

"CAMP IN THE WOODS" in Sherburne County, near Princeton, Minn., leads strong support to the belief that much of the farm income in the future will come from rural recreation.

Owner Len Thayer is a full-time contractor operating draglines and bulldozers during the busy summer season. He carries on a part-time farm operation of sheep raising and a hobby sideline of a few Arabian horses on a sandy 169-acre farm. He is also a cooperator of the Sherburne Soil and Water Conservation District.

During the summer of 1964, he and his family made a camping trip through the Black Hills of South Dakota where they tented in private camps along the way. This experience gave them the idea that they had a fine site for a private camp right at home in the "back 40" of second growth oak woods. They figured that Len could work on it during the off season of his contractor's job. His wife, Gwen, and the children could run the show during the summer camping season.

After returning from South Dakota, the Thayers spent a lot of time visiting camps all over northern Minnesota and Wisconsin to get ideas. The camp operators proved to be most cooperative in showing them around and passing on ideas on successful camp operation.

For technical help and information they turned to State Forest Ranger Darwin Anderson of the Sand Dunes State Forest, Larry Simonson of the Minnesota Agricultural Extension Service, the Minnesota State Board of Health, and the Soil Conservation Service.

"Camp in the Woods" was opened to the public the last of June in 1965. Campers found 40 tent and camping trailer sites in the woods with all the facilities for convenient and enjoyable camping. A recreation and service area in the old pasture at the edge of the woods included a small store and office, storage and equipment buildings, shower rooms, and a fine, fiberglass-lined swimming pool.

The charges include: A camp fee of $2 a night for a campsite; $2.25 for a campsite with electric outlets, with some reduction for camping by the week; and $0.25 a person for swimming. During the week anyone may come in to swim, but on weekends the pool is restricted to campers only.

Beautiful Elk Lake, where fishing and boating may be enjoyed, is not far from camp. Through special arrangement with a resort owner, campers with boats have free access to the lake.

Just before opening and for the 4th of July, the camp was advertised in the papers of nearby towns and regularly in the Vacation Guide section of a Minneapolis Sunday paper.

Public acceptance was immediate and good, exceeding the expectations of the proprietors. The camp has been well filled every weekend, and there have been many midweek campers, too.

A majority of the camp patrons came from the Twin Cities and nearby Minnesota, but six other States and Canada have already been represented with one camper from Arizona coming the farthest.

The Thayers were enthusiastic over the early success of their new enterprise and immediately after the close of the 1965 season started to improve and enlarge their camp.

They added 25 new campsites and a recreation hall near the swimming pool.

In 1966 group campers included local chapters of the National Campers and Hikers Association, Boy Scouts and Girl Scouts, Campfire Girls, and many church groups. On some weekends as many as 400 to 500 campers were on the grounds at one time.

In 1967 the Minnesota members of the National Campers and Hikers Association will hold their State meeting at Camp in the Woods. The Thayers plan to have more than 100 campsites ready for this season.—HENRY WILSON, *formerly Soil Conservationist, SCS, St. Cloud, Minn.* ♦

School for Retarded Uses Water-Based Therapy

By William R. Hauck
Work Unit Conservationist, SCS, Woodsville, N.H.

THE Laconia State School, Laconia, N. H., may have accomplished a real "first" in soil conservation history. A 1/3-acre pond was built exclusively for residents of this institution for the mentally retarded. Already, the innovation is showing results for the adults.

Mrs. Anne Tilton, the school's occupational therapist, came up with the idea and Arthur Toll, superintendent, gave the project his whole-hearted support. His main concern was finding a spot for the pond that allowed easy access and supervision.

At Mr. Toll's request the Soil Conservation Service helped him make the selection. The SCS had assisted the school with many of its farming problems since the late 1940's when it became a cooperator with the Belknap County Soil Conservation District.

Bob Wilson, recreation director, shows a group of boys (above) how to remove the hook from a trout caught in their new pond (below), which was stocked by the New Hampshire Fish and Game Department.

The soil conservationist found the first proposed site unsuitable for a pond. The soil survey map indicated another area, and borings confirmed that the soils were satisfactory. The conservationist also pointed out possibilities for developing the surrounding woodland into a safe recreational area, including a playfield, picnic area, and nature tour.

To help pay for the work, the Laconia State School Parents Association donated $1,500. SCS conservationists designed the pond and supervised construction, which was completed in October 1965.

In December, lessons in ice skating began. By mid-January more than 30 children had been taught to skate, and about 200 more had been taken out on the ice just to slide and have fun.

"The sound of these children laughing as they glide over their very own pond on a brisk New Hampshire winter day is wonderful to hear," Mr. Toll said.

Eventually, Mr. Toll hopes to get outdoor grills so the youngsters can learn to cook the fish they catch. Local sportsmen will be invited to coach boys and girls in tying flies and in catching and cleaning fish.

"This whole area was just wasteland a year ago," Mr. Toll said. "But with soil, water, and forestry conservation practices, we will reap more here than in most conservation areas. And this is because we, too, are conservationists. Only, we deal in 'human conservation'." ♦

A Conservation Profile:

Ex-Governor Believes in Wise Use of Land and Wildlife

WATERFOWL and vegetables, fish and trees, education and conservation—these are well-known on New Mexico's ex-Governor Tom Bolack's ranch.

On the same ranch can be seen 100 different kinds of vegetables, grains, and domestic grasses; a flock of almost tame "Canada honkers;" and trees grown to be given away. All this takes place on the B-Square Ranch in northwestern New Mexico where Governor Bolack is a cooperator with the San Juan Soil and Water Conservation District. It didn't come easy; nor without planning.

Tom Bolack wants to keep New Mexico green. Last year he gave 51,000 trees grown on the ranch to schools, churches, and other organizations to help beautify their grounds. Most of the trees were Navajo willow, poplar, and cottonless cottonwood grown from cuttings.

Wise land use

He is a believer in wise land use. "Every farmer and rancher should make the best use of his land," explains Bolack, and adds, "there is nearly always an odd corner, ravine, or other place to grow wildlife food and cover."

Fish ponds are a specialty on the ranch. In a 5-acre trout pond, an aerator was installed so more oxygen could be supplied to the fish during critical periods of the year. The ponds are fertilized with commercial fish food to assure maximum growth. A few 7-pound fish have been taken from these ponds, and many average-sized trout are harvested each year.

There are more than 50 small islands along the shore of one of the larger lakes. Bolack explains that these places are the nesting grounds for Canada geese and mallard ducks.

Increase cover

To increase the cover and food for wildlife, 15,000 trees and shrubs have been planted on the bottom land. Close to the lakes, wheat, corn, and grain sorghums are planted in 1- to 3-acre patches to provide food for the game birds and other animals during the winter months.

On his 60 acres of wet lands, it is estimated by the New Mexico State Game and Fish Department that during the fall and spring migratory seasons more than 10,000 game birds find food and cover.

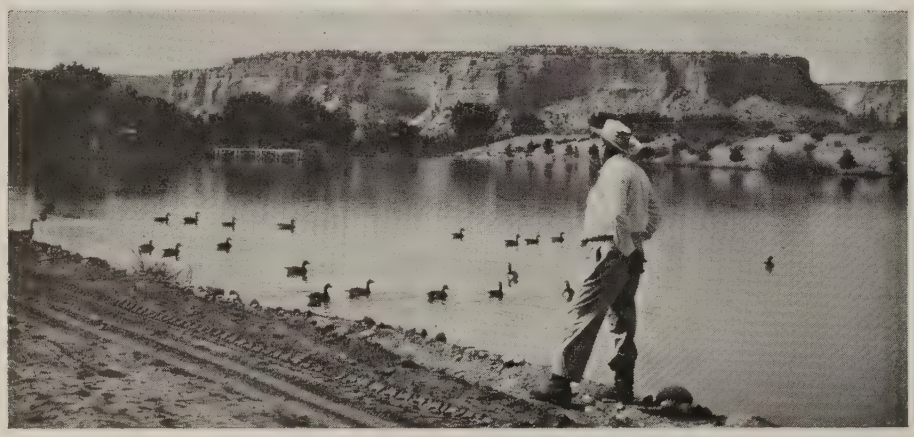
Governor Bolack has been a cooperator with the San Juan District since 1957. When some of his best land was plagued with a high water table, the Soil Conservation Service designed and staked a drain ditch that lowered the water table about 4 feet. Now this land is growing vegetables, feed grains, and a good many of the trees that he gives to institutions in New Mexico.

Concrete ditch structures have been installed on the farm to control the irrigation water. Since vegetables are raised every year on most of the land, the fertility of the soil must be kept up. Each year after the vegetables are harvested, the land is planted to small grain as a cover and green manure crop. In the spring, this vegetation is plowed back into the soil after it has grown 6 to 10 inches high. Last spring 3,000 tons of barnyard manure was hauled from a dairy farm and spread to help the soil-building crops.

In 1966 more than 12,000 school children visited his ranch, viewed his wildlife and conservation oper-

Tom Bolack of New Mexico

Governor Bolack delights in the Canada geese that visit his ponds.



ation, and were shown the game trophies he has in his ranch house. Thousands of people attending local conventions in that part of the State have visited the B-Square and observed conservation at work.

Bolack has been mayor of the city of Farmington, president of the Farmington Chamber of Commerce, representative to the State legislature, lieutenant governor, and governor of the State of New Mexico.

He is a director-at-large for the United States Chamber of Commerce. He is a committee member and worker for the Upper Colorado River Project.

Last year he was awarded the "Ducks Unlimited" plaque for his outstanding contribution to waterfowl conservation and propagation from J. Bryan Stevenson, State chairman for Ducks Unlimited. ♦

Economics of Outdoor Recreation. By Marion Clawson and Jack L. Knetsch. *1966. Johns Hopkins Press, Baltimore (for Resources for the Future, Washington, D. C.) 328 pp. $8.50.*

Two well-qualified resource economists on the staff of Resources For The Future have collaborated on a thorough-going treatise on the economics of outdoor recreation.

The publishers say the book "is directed primarily towards recreation administrators and planners and students in these fields, but it will also be of interest to social scientists generally."

By necessity, the book is highly theoretical, but it can be useful in studying the economics of supply and demand for outdoor recreation. It is not a guidebook to recreation management but a scholarly source book for people concerned with the methodology of outdoor recreation analysis. Those unfamiliar with economic theory and principles may find the book heavy going.

Important to the student of outdoor recreation is the treatment of the very complex interrelationships which so often develop between the recreation area, the user, and recreation use. User preferences, demographic characteristics of users, locational aspects of sites, the influence of rules of management and institutional requirements, such as zoning, standards of operation, permits and licenses, are discussed with unusual skill.

Part IV contains lively and challenging chapters on the value of land and water resources when used for recreation, economic impacts of outdoor recreation on local areas, costs and investment considerations in providing public recreation facilities, and pricing and paying for public outdoor recreation facilities.

The authors assume that recreation workers have a growing concern for the economic and social aspects of recreation. This reviewer hopes such concern is widespread and that the book commands extensive attention and use among professionals in the recreation field.—Lloyd E. Partain, *Assistant to the Administrator for Recreation, SCS.*

Future Environments of North America. Edited by F. Fraser Darling and John P. Milton. *1966. Natural History Press, Garden City, N.Y. 767 pp. $12.50.*

Future Evironments of North America is the record of a conference sponsored by the Conservation Foundation and includes 34 scholarly papers plus verbatim reports on the intrasession discussions.

F. Fraser Darling, who served as chairman for the conference, set the stage for the wide-ranging ideas of the meeting by characterizing it as a "game of projectionism." Louis Mumford warned in his closing statement against letting technology supersede human values in the future environments.

To attempt to read the volume straight through is an experience in total immersion that only the most dedicated "conservationist" could survive. But to keep it handy will tempt the reader to many absorbing and profitable hours.

There are few aspects of the environment, the developmental history of resource use, and the economic and social patterns related to conservation which are not explored here. In some instances, the discussions which took place between papers were more interesting and revealing than the papers themselves.

Among the 34 participants are many impressive names, such as Durward Allen, A. Starker Leopold, Firman Bear, Gilbert White, Kenneth Boulding, Marion Clawson, Joseph Fisher, Pierre Dansereau, and Ian McHarg.

The book is dedicated to the late Edward H. Graham, former Director of the Plant Technology Division of SCS, who died not long after the conference was held. He served as a deputy chairman, and took a leading role in many of the group discussions.

In introducing the session on "Regions: Their Developmental History and Future," Dr. Graham said, "There is evidence today... to indicate that man is beginning to think of himself as part of nature. In doing this, I think the ecologist is going to have to give full consideration not only to environment, but to ideas and inventions and attitudes as parts of the ecosystem."

It is a stimulating experience to be exposed to the thinking of so many creative minds as they consider the broad field of conservation. Whether the reader is searching seriously for new ideas or simply enjoying the game of "projectionism," this is one of the books no conservationist should pass by.—Katharine Mergen, *Information Division, SCS, Washington, D. C.*

New Publications

The Creek and the City. *1967.* NARRATIVE BY JOHN GRAVES. *U.S. Dept. of Int. 52 pp., illus.* A special report to the Nation on urban pressures on a natural stream—Rock Creek Park and metropolitan Washington.

As an extension of its assignment to prepare a plan to make the Potomac River a model of conservation for the Nation, the Department of the Interior prepared a special staff report on Rock Creek, a small tributary that flows through the District of Columbia.

The Department has a special concern with this stream because its flood plain and gorge comprise Rock Creek Park administered by the National Park Service. The entire Nation has an interest in it because of its intimate relation to the Nation's capital and its history.

The watershed provides an excellent example of the complex problems that assail any small watershed in a suburban setting. The report is valuable as a case study for citizens and watershed planners everywhere.

The Public Law 566 watershed project already underway, the influence of the soil conservation district, and the work of the Soil Conservation Service are recognized as major factors in the needed program for sediment control and land use planning.

Much of the information for the report was provided by the Soil Conservation Service.

Mosquito Prevention on Irrigated Farms. BY BULLETIN TASK FORCE, SUBCOMMTTEE ON VECTOR CONTROL, INTER-AGENCY COMMITTEE ON WATER RESOURCES. *1967. USDA Agr. Hbk. 319. 32 pp., illus.* Gives information on the overall importance of irrigation-mosquito problems; manmade mosquito sources on irrigated farms; relationship of mosquito prevention to good irrigation agriculture and aquatic wildlife conservation; and basic principles and practices for mosquito prevention on irrigated farms.

Review of Research on Laterites. BY R. MAIGNIEN, *1966. United Nations Educational, Scientific, and Cultural Organization (UNESCO, Paris). Unesco Publications Center, New York, N. Y. 148 pp., illus. $5.00.*

Prolific literature has developed since F. Buchanan (1807) gave the name "laterite' to the mantle of ferruginous depositions which covers large areas in southern India. At the request of Unesco, R. Maigniem prepared a review of research on laterites for use as a basis of discussion on laterites organized by Unesco and held at Tananrive, Madagascar, in 1964.

The result of the symposium is the publication of this book as a volume of the "National Resources Research" series. The main topics the author covers are the morphological and analytical characteristics of laterites and their global distribution, origin, clasification, and utilization.

Guidelines for Establishing Water Quality Standards for Interstate Waters. *Rev. 1967. U. S. Dept. Int., Federal Water Pollution Control Administration. (14 pp.)*

Comprehensive Plans for Improving Rural Counties. BY ERLING D. SOLBERG. *1967. USDA. Agr. Inf. Bul. 316. 10 pp., illus.* This bulletin, by the Economic Research Service, offers step-by-step suggestions for planning—from the setting up of a planning board through listing of needs for economic, civil, legal, cultural, housing, and natural resources planning.

Soil Surveys

Henderson County, Kentucky. BY HENRY T. CONVERSE, JR., AND FRANK R. COX, JR.. *1967. 108 pp., illus.; maps 4 inches to the mile (1:15,840).* Field survey by Henry T. Converse, Jr., Frank R. Cox, Jr., Eullas Jacobs, Robert C. Bryan, and James C. Ross.

Franklin County, Massachusetts. BY JOHN R. MOTT AND DONALD C. FULLER. *1967. 204 pp., illus.; maps 4 inches to the mile (1:15,840).* Soils surveyed by F. A. Filios, D. C. Fuller, and C. F. Hotz.

Menard County, Texas. BY DANIEL R. COFFEE. *1967. 51 pp. illus.; maps 3.17 inches to the mile (1:20,000).* Soils surveyed by Daniel R. Coffee, Otto W. Bynum, and D. Randolph Burton.

Treasure County, Montana. BY RONALD L. MOSHIER AND ARMER G. FIELDER. *1967. 173 pp., illus; maps 3.17 inches to the mile (1:20,000).*

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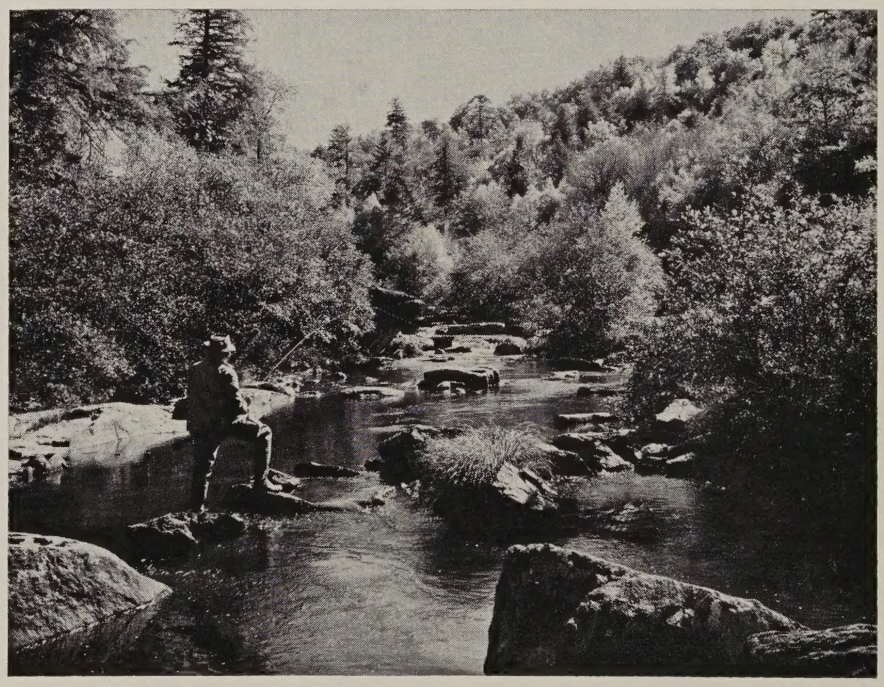

America The Beautiful—North Carolina USDA SOIL CONSERVATION SERVICE

TROUT FISHING IN SILT-FREE STREAM, AVERY COUNTY SOIL AND WATER CONSERVATION DISTRICT

Full-color lithograph prints suitable for framing—one for each State, Puerto Rico, and Virgin Islands—are available from the Superintendent of Documents for 10 cents each or $5.00 for set of 52. Obtain order blanks from your local SCS or post office.

From the Administrator:

A New Conservation Charter for USDA

One of the most important conservation documents of our times is now being distributed to conservation leaders and workers throughout the Nation.

The publication, *Resources in Action,* is the product of a departmentwide study under the direct leadership of Secretary of Agriculture Orville L. Freeman. It redefines the resource conservation mission of USDA in light of needs today and for the rest of the century. It outlines timely new policies and goals. It points to ways these policies and goals will be implemented.

The publication has threefold significance. It spells out the nature and dimension of conservation action urgently required to meet the resource needs of American people between now and the year 2000. It demonstrates that, by the very location and character of these resource problems, USDA has major responsibility for conservation leadership. And, finally, it charts for USDA the essential steps we must take in our programs and in our cooperative efforts with other agencies and units of government, and with citizen groups, to achieve the goals.

The policies and goals, moreover, are particularly geared to the growing concern for the quality of man's total environment. Conservation of that environment, Secretary Freeman asserts in the foreword, "is a physical task, a social philosophy, and an economic necessity."

As the report says, conservation today encompasses the full sweep of interrelated natural resources and their management and use. Use, restoration, and preservation are compatible aims. Through skillful multiple-use management, we can and must reverse the downward trend in the quality and adequacy of the natural world in which we live.

This is "creative conservation" —a "full-use" policy. It is needed to guide the American people in the use of their renewable natural resources in the face of exploding technology and unremitting population pressures. It recognizes the need for involvement of people and their governments in conservation programs at the ground level.

The study blueprints seven major objectives toward which USDA's conservation efforts will be vigorously directed. Each of these contains a clear charge to the Soil Conservation Service; for we, in turn, bear a high degree of responsibility as the Departments's technical arm for action in soil and water conservation. These objectives are:

—Upgrading the quality of the environment.

—Strengthening the economy and standards of living in rural America

—Helping to find solutions to America's water problems.

—Obtaining greater benefits from our forest lands.

—Providing creative opportunities for outdoor recreation.

—Widening public awareness and involvement in resource conservation.

—Helping other nations solve their resource problems.

To achieve these objectives, we must do more than accelerate the pace of accomplishments in the familiar approaches to conservation. The times call for some specific new working tools. *Resources in Action* charges SCS, along with other USDA agencies, to:

—Search out and promote the best possible scientific management techniques to meet future resource needs efficiently without damage to the land or to the environment.

—Extend the multiple-use concept of resource planning to all land resources to obtain the best possible patterns of planned resource use and rural development.

—Develop our resource capacity sufficiently to assure abundant supplies of food and timber, as well as clean water, pure air, more outdoor recreation, and a more wholesome and beautiful environment.

—Stimulate more effective local leadership in conservation through State and local governments, by soil and water conservation districts and other conservation groups, and by the owners of large and small timber holdings.

Resources in Action goes beyond these wide-brush strokes, however, to delineate in considerable detail many individual policies and goals that become parts of the whole.

For this reason, the document will be "required homework" for all SCS employees.

I hope it will likewise be a useful study reference for the leaders of soil and water conservation districts, sponsoring groups of watershed projects and resource conservation and development projects, and others with whom we work.

Determination and intelligent application of skills will be required from each of us to insure that the Soil Conservation Service does its part in this all-important task which Secretary Freeman has dubbed "Agriculture/2000."

I have assured the Secretary that we are committed fully to helping USDA fulfill the tremendous responsibility it bears for leadership in resource conservation, both at home and abroad.

D. A. Williams

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Field Day Lets Students See Farm Activity

AN ANNUAL field day gives fourth graders in Fremont, Ohio, an opportunity to visit a farm and see how food is grown and resources are conserved.

The Sandusky County Soil and Water Conservation District board of supervisors cooperates with Dr. R. B. Oldfather, superintendent of public schools, in arranging the trip to the Christy farm nearby.

The teachers are given information on the subject matter a month before the tour is to be held in May. The children study the information in preparation for the trip.

The classes are divided into groups of 60 that stop at 4 stations where experts explain features of the farm.

At the first stop the children see cows, sheep, hogs, barns, hay, and grain. County Agents Glenn Maddy and Fran Junis explain how livestock are cared for and what products we get from them.

Many students get their first opportunity to touch farm animals on the conservation field day. County Agent Glenn Maddy holds the lamb.

At the second stop, Dave Coulter, SCS soil conservationist, discusses soils and their relation to man. A soil pit is used to illustrate soil layers and characteristics.

The groups visit a farm woods and see trees and wood products. Ed Hoffman, a Sandusky County farmer and member of the Ohio Forestry Association, explains the need for forests and demonstrates products made from trees.

At the fourth stop, George Ledbetter, Sandusky County game protector, tells the students about wildlife in Sandusky County. He shows them plantings that were made on the Christy farm in 1960 and 1961 for wildlife food and cover.

Farm wagons are used to transport the children between stops. Most of them experience their first ride on a farm wagon on the trip.—JOHN E. BATTLES, *Work Unit Conservationist, SCS, Fremont, Ohio.*